



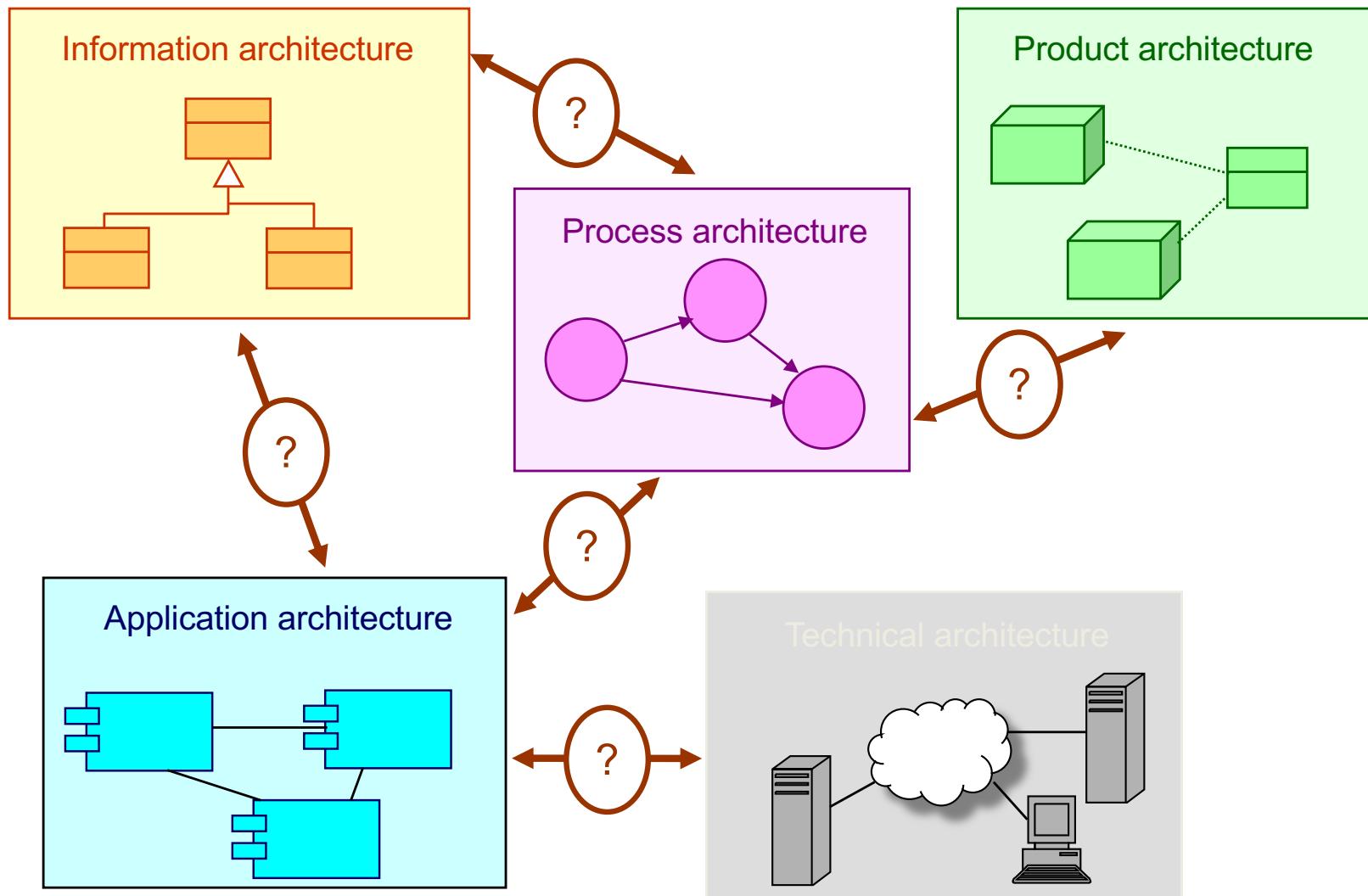
POLITECNICO
MILANO 1863

Sistemi Informativi (per il settore dell'informazione)

Ingegneria Informatica

Esercitazione:
ArchiMate

Enterprise Architecture



ArchiMate

«Just as an architectural drawing in classical building architecture describes the various aspects of the construction and use of a building, the **ArchiMate Specification** defines a common language for describing the **construction and operation of business processes, organizational structures, information flows, IT systems, and technical infrastructure**. This insight helps stakeholders to **design, assess, and communicate** the consequences of decisions and changes within and between these business domains.»

*The ArchiMate® Enterprise Architecture Modeling Language,
the Open Group, 2019*

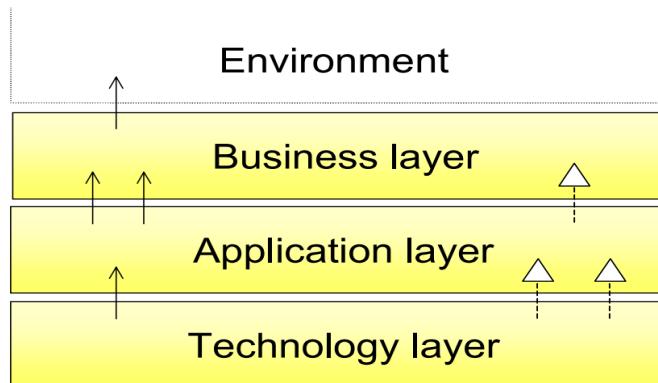
ArchiMate

«Just as an architectural drawing in classical building architecture describes the various aspects of the construction and use of a building, the **ArchiMate Specification** defines a common language for describing the **construction** and **operation** of **business processes**, **organizational structures**, **information flows**, **IT systems**, and **technical infrastructure**. This insight helps stakeholders to **design**, **assess**, and **communicate** the consequences of decisions and changes within and between these business domains.»

*The ArchiMate® Enterprise Architecture Modeling Language,
the Open Group, 2019*

Layer

- Business Layer: modellazione dei processi dell'organizzazione, degli attori che vi partecipano e dei prodotti e servizi resi disponibili
- Application Layer: modellazione delle applicazioni software che supportano processi ed attori
- Technology Layer: modellazione di elementi di infrastruttura (es. elaborazione, memoria, storage, comunicazione) necessari per l'esecuzione delle applicazioni



Tipi di elementi

- 3 tipologie di elementi corrispondenti a classi di entità nel mondo reale: active structure element, behavior element, passive structure element

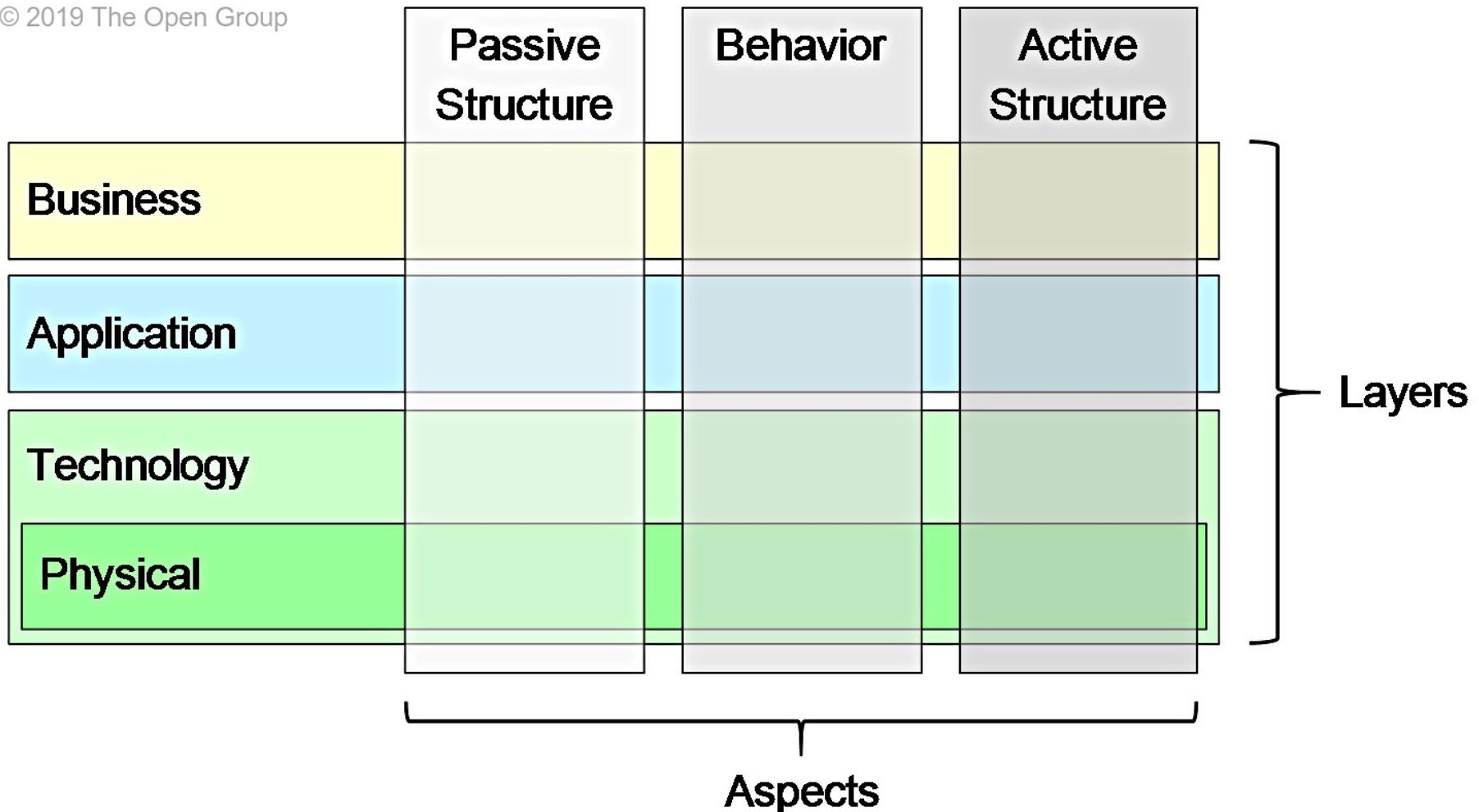
An **active structure element** is defined as an entity that is capable of performing behavior.

A **behavior element** is defined as a unit of activity performed by one or more active structure elements.

A **passive structure element** is defined as an object on which behavior is performed.

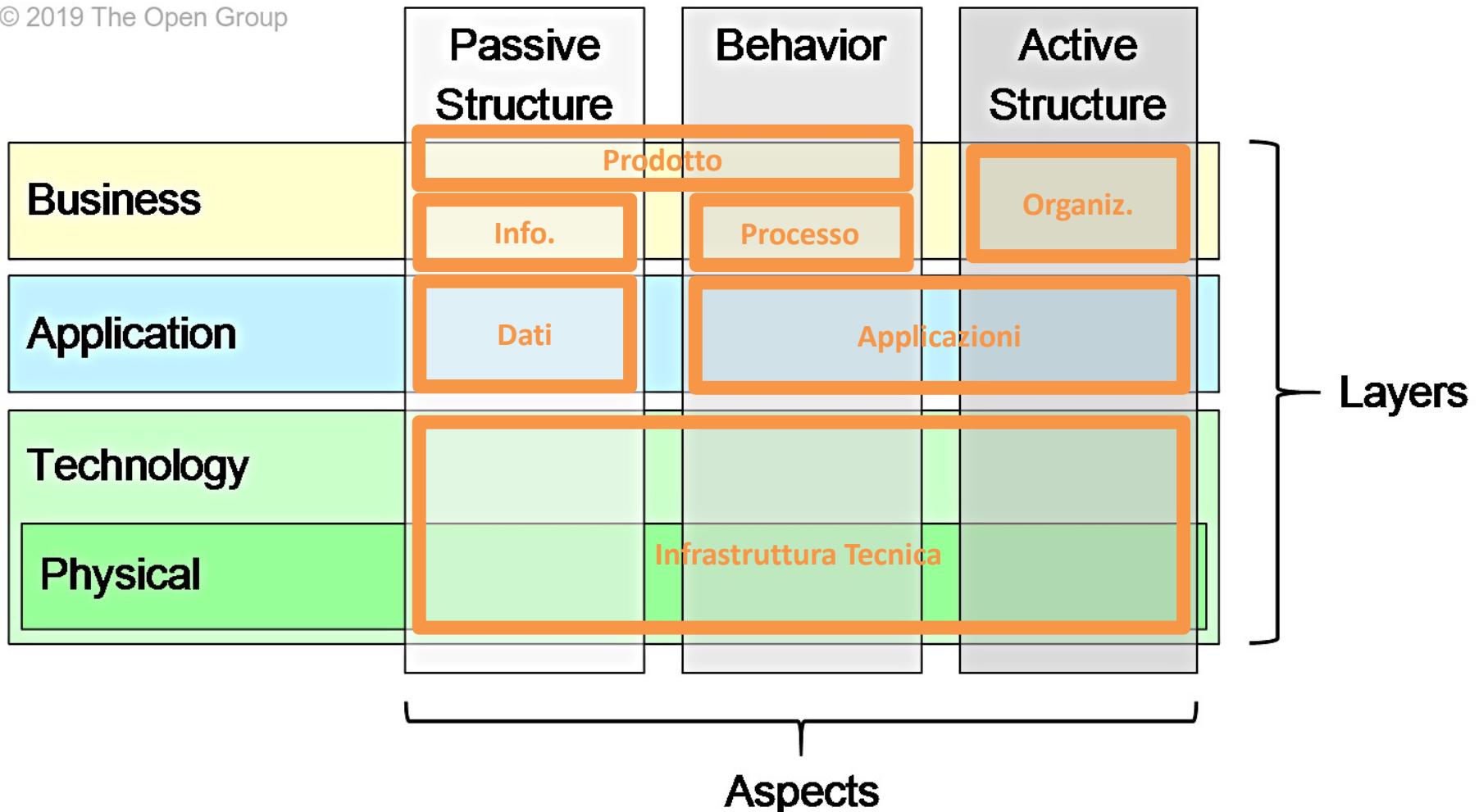
ArchiMate Core

© 2019 The Open Group



ArchiMate Core – Domini

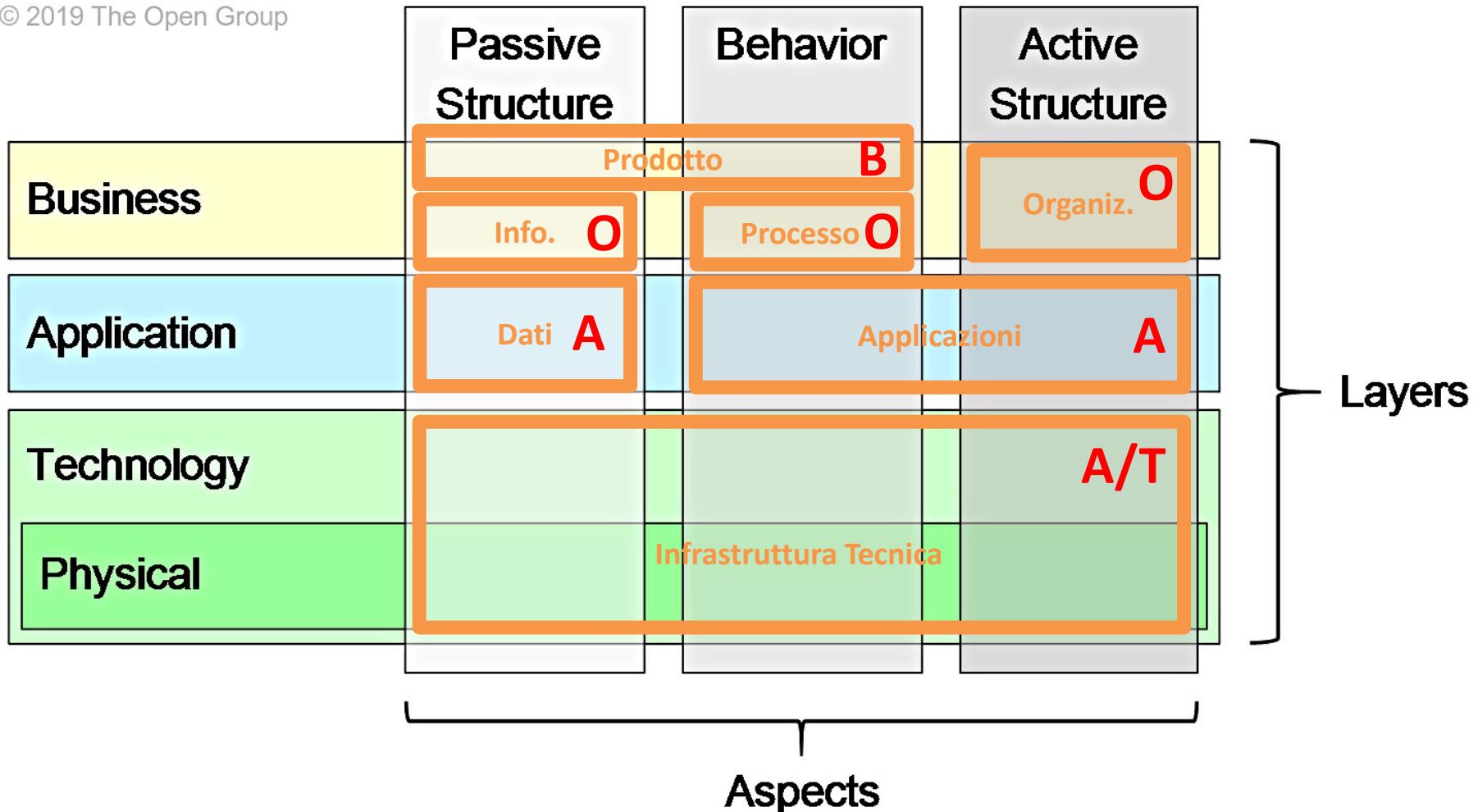
© 2019 The Open Group



ArchiMate Core – Domini

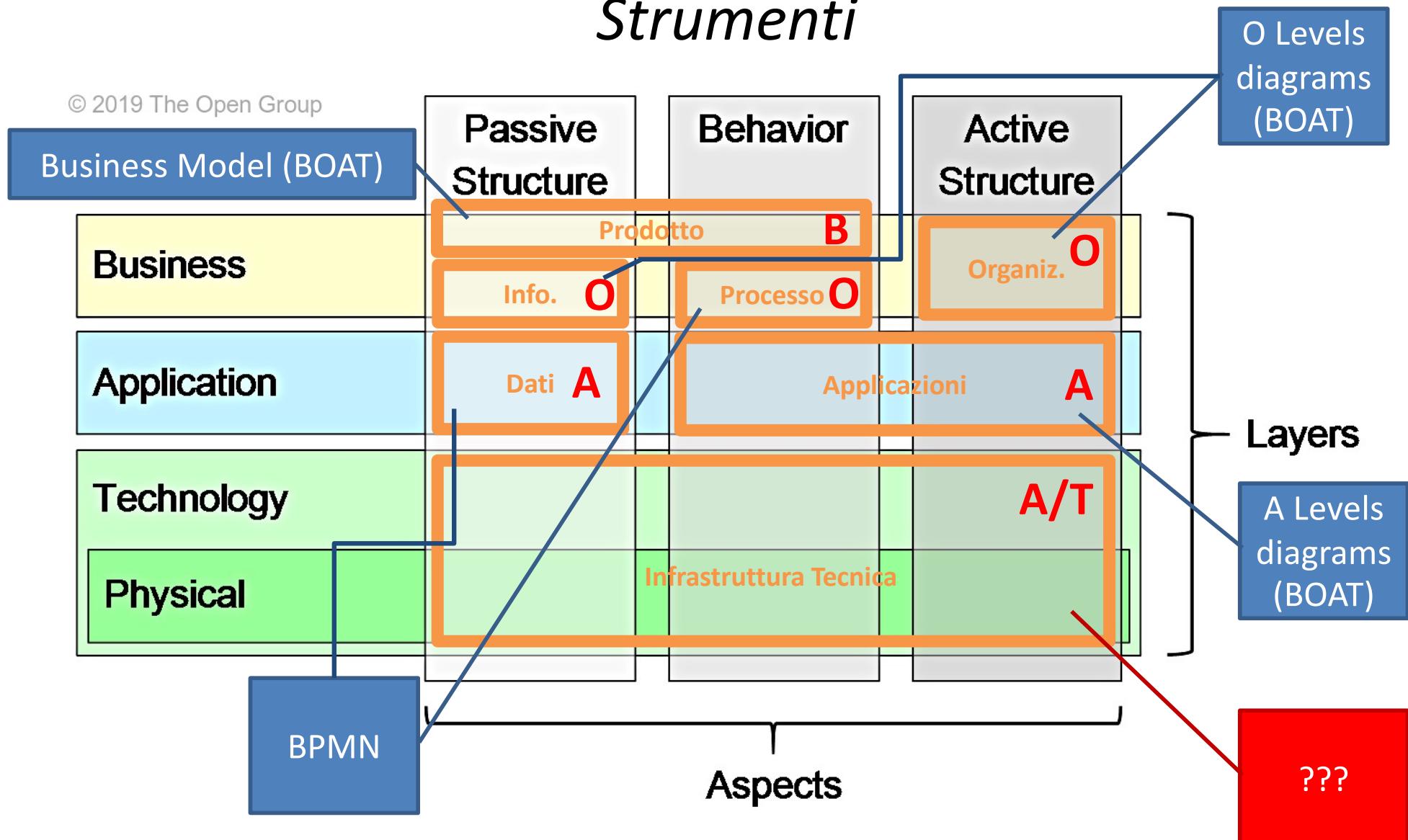
Confronto con BOAT

© 2019 The Open Group



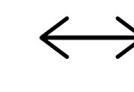
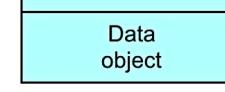
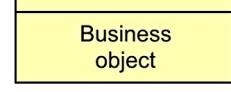
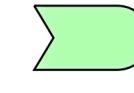
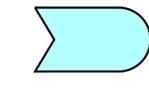
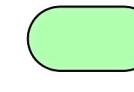
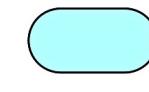
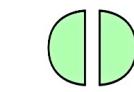
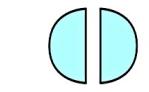
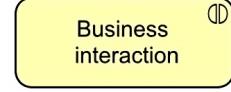
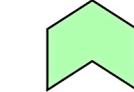
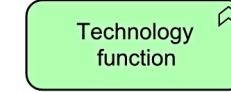
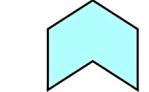
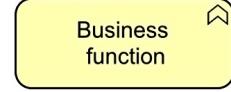
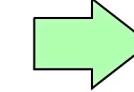
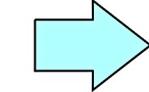
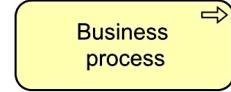
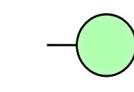
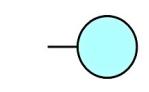
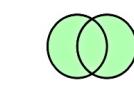
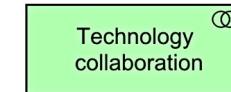
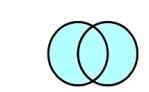
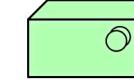
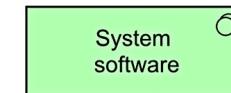
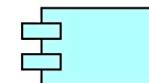
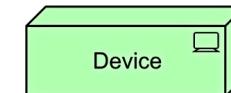
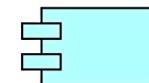
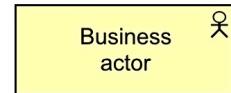
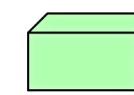
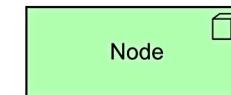
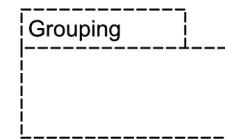
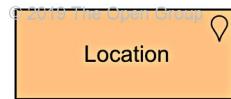
ArchiMate Core – Domini Strumenti

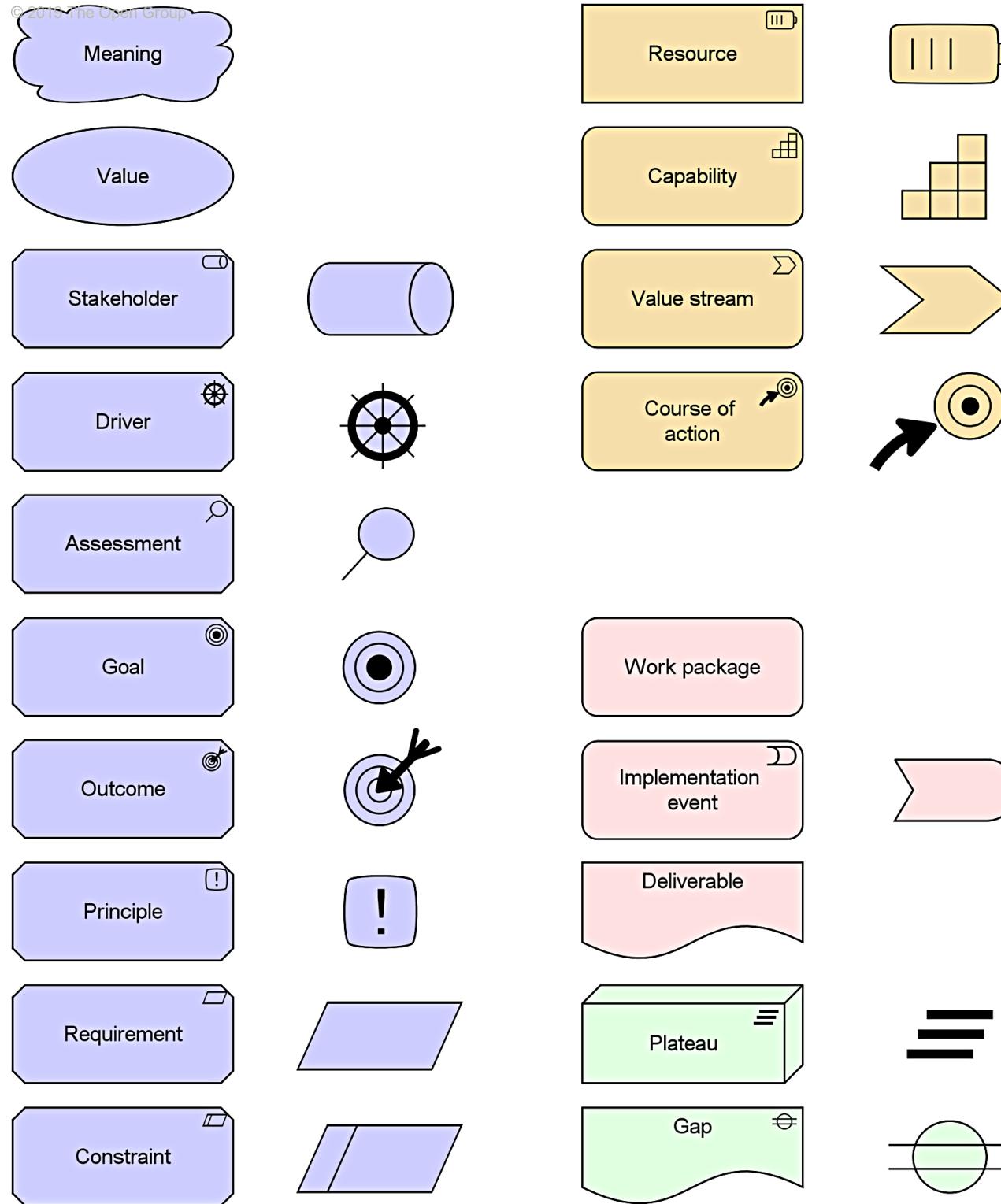
© 2019 The Open Group



ArchiMate

NOTAZIONE

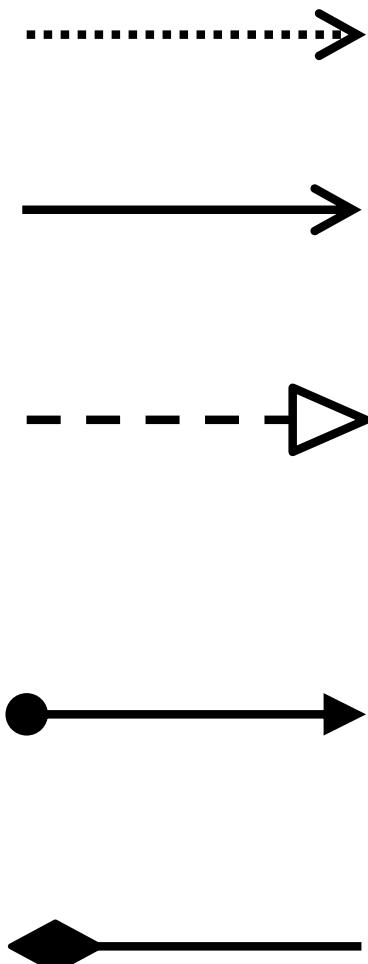




Entità (focus del corso)

	Passivo	Comportamento	Attivo
B	Business Object	Business Service Business Process	Business Interface Business Role
A	Data Object	Application Service Application Function	Application Interface Application Component
T	Artifact	Technology service Technology Function	Technology Interface Node

Relazioni



Accesso (dipendenza)

DA Comportamento A Passivo

Il comportamento fa uso di una entità passiva

Serve a (dipendenza)

DA / A Entità dello stesso aspetto (escluso Passivo)

L'entità in testa usa l'entità in coda

Realizzazione (struttura)

DA / A Entità dello stesso aspetto

(DA Artefatto A Componente)

L'entità in coda crea\fornisce\implementa l'entità in testa

Assegnamento (struttura)

DA Attivo A Comportamento

DA Nodo A Artefatto

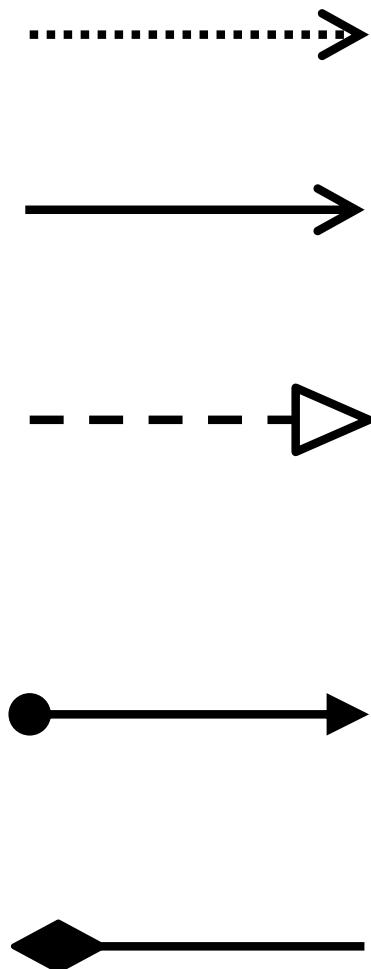
L'entità attiva esegue il comportamento/l'artefatto

Composizione (struttura)

DA / A Entità dello stesso aspetto

L'entità in coda è parte indivisibile dell'entità in testa

Relazioni



- Accesso (dipendenza)**
- DA Comportamento A Passivo
Il comportamento fa uso di una entità passiva
- Serve a (dipendenza)**
- DA / A Entità dello stesso aspetto (escluso Passivo)
L'entità in testa usa l'entità in coda
- Realizzazione (struttura)**
- DA / A Entità dello stesso aspetto
(DA Artefatto A Componente)
L'entità in coda crea\fornisce\implementa l'entità in testa
- Assegnamento (struttura)**
- DA Attivo A Comportamento
DA Nodo A Artefatto
L'entità attiva esegue il comportamento/l'artefatto
- Composizione (struttura)**
- DA / A Entità dello stesso aspetto
L'entità in coda è parte indivisibile dell'entità in testa

Forza crescente della relazione

Orientamento al servizio

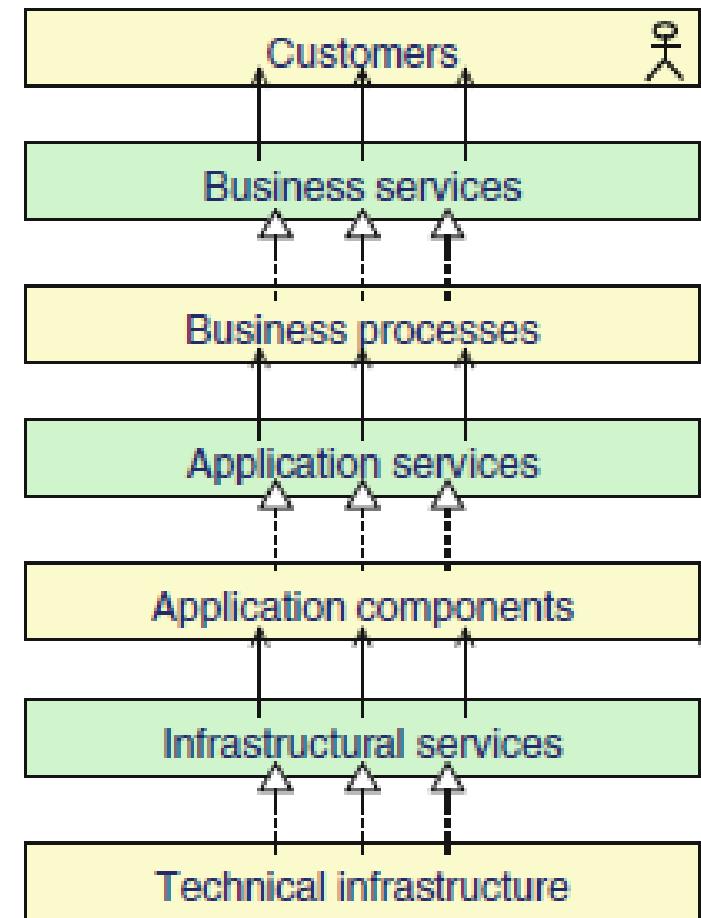
- Il servizio rappresenta un comportamento del sistema visibile dall'esterno, dal punto di vista di chi utilizza il servizio (utente o altro sistema)
- Interfacce per l'accesso al servizio
- Rilevanza per l'ambiente (inteso come contesto in cui l'enterprise opera)

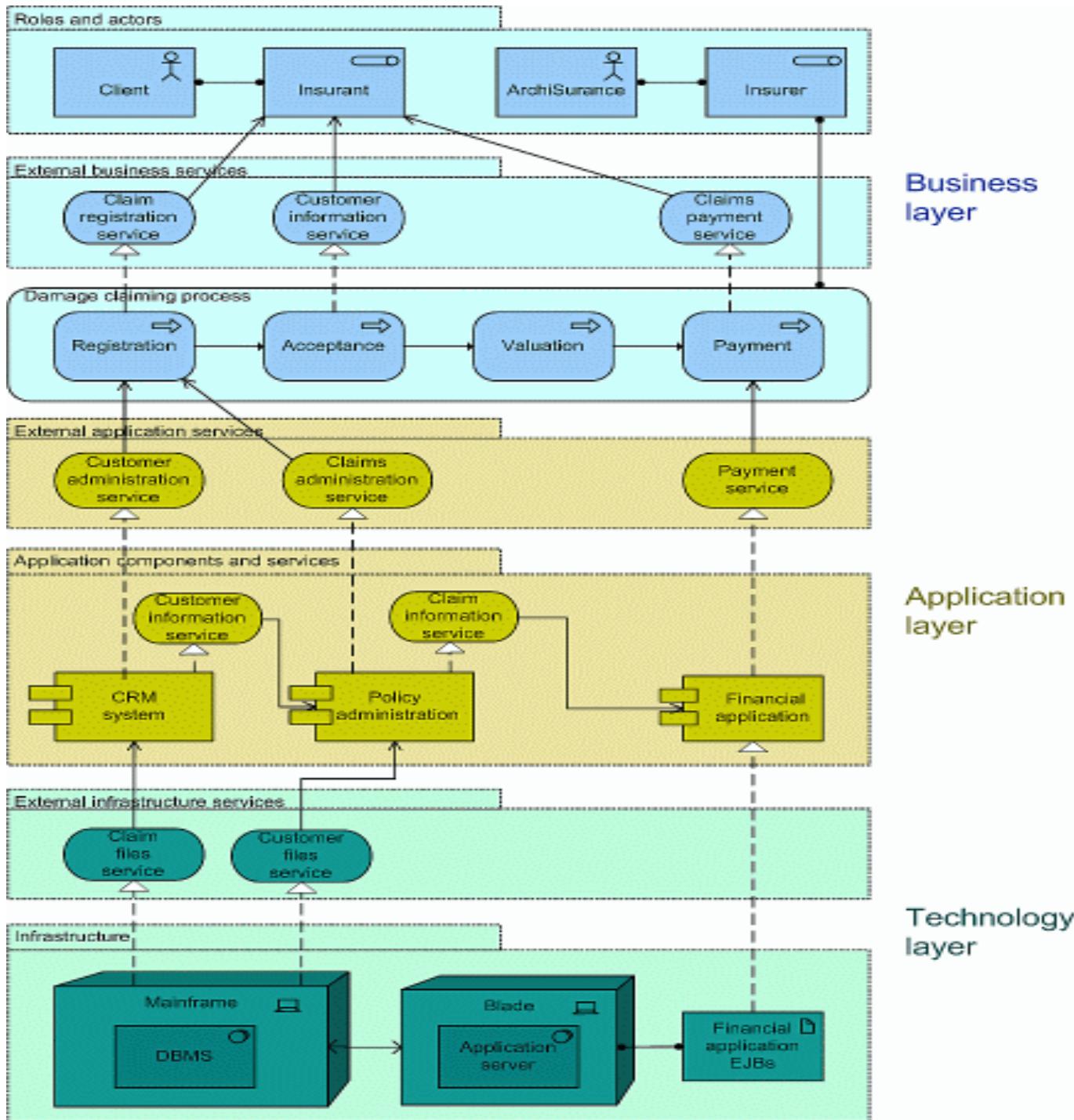
A **service** is defined as a **unit of functionality** that a system exposes to its environment, while hiding internal operations, and that provides a certain value (monetary or otherwise).

An interface is defined as a **point of access** where one or more services are made available to the environment.

Service Oriented Architecture

- **Components** (application, business, software) **provide services** to other components
- **Services** are central to Archimate architecture models



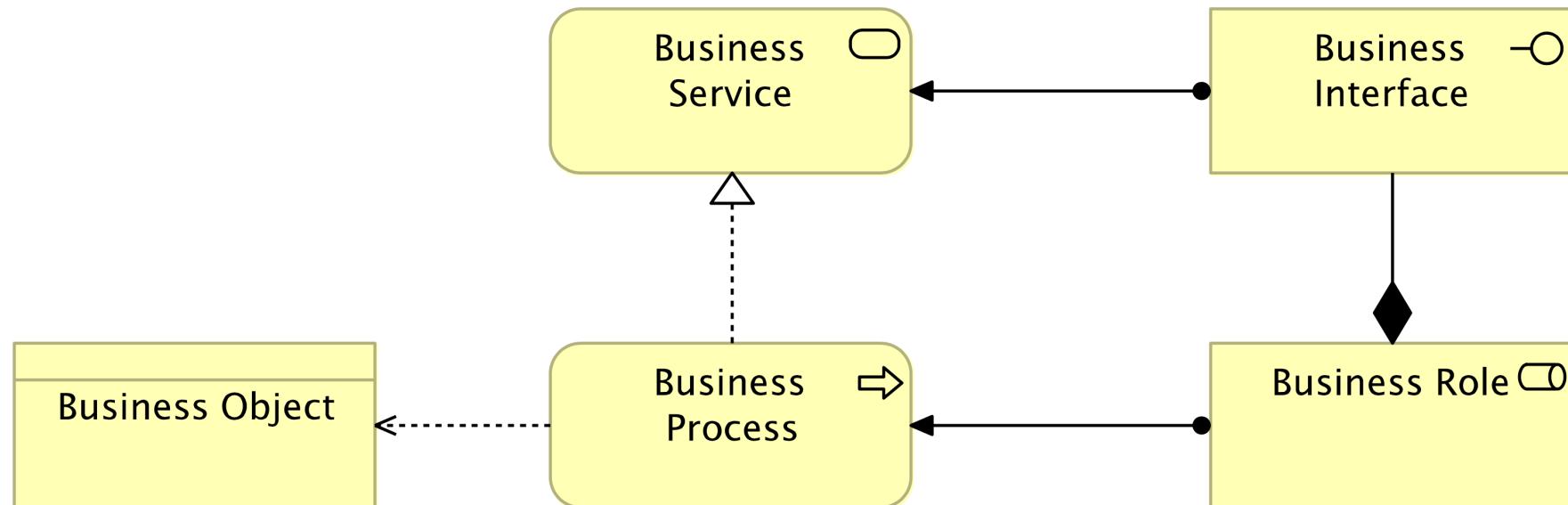


Gli elementi del linguaggio possono essere combinati in differenti modi, generando delle **“viewpoint”**, funzionali ad evidenziare specifici aspetti dell’enterprise architecture

ArchiMate

PATTERN NOTEVOLI

Pattern – Business



←----- This is the **Access** relation

→◆ This is the **Composition** relation

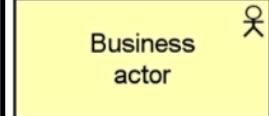
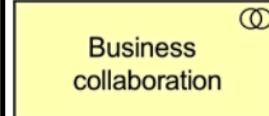
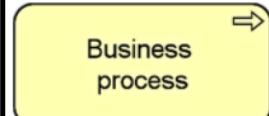
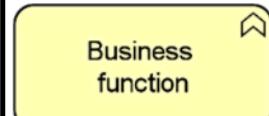
◀----- This is the **Realization** relation

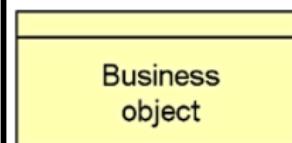
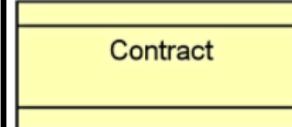
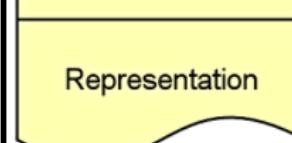
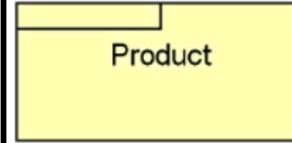
↔● This is the **Assignment** relation

Access = possibility to observe or act on

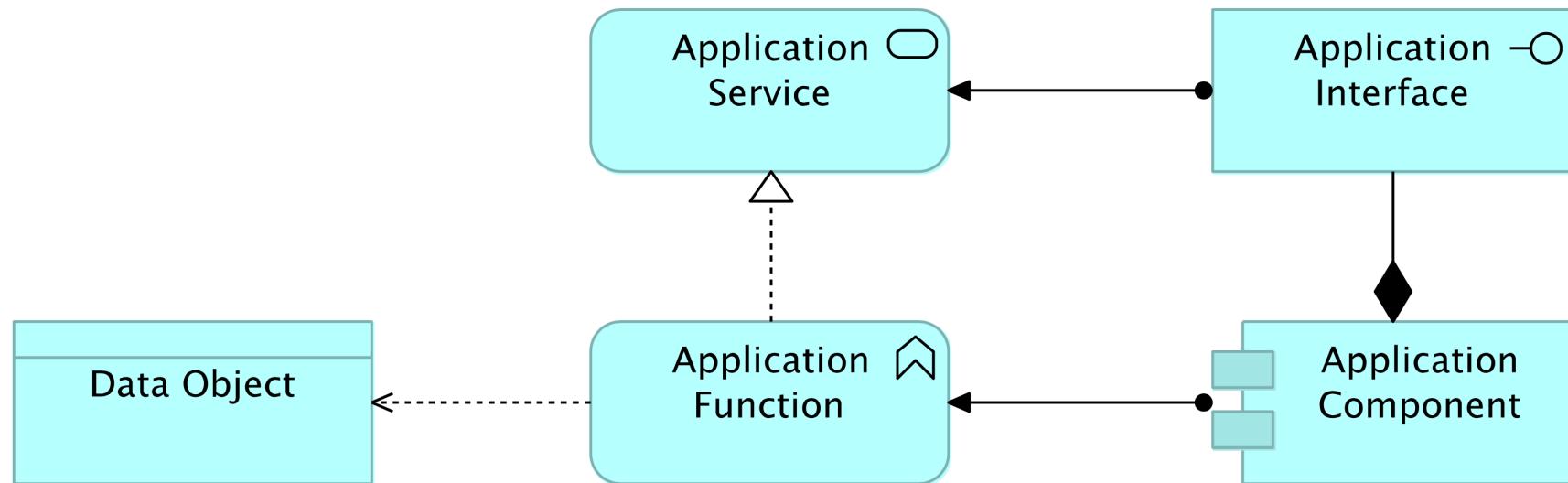
Realization = creation

Assignment = responsibility

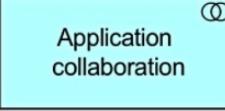
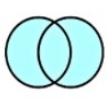
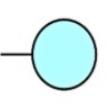
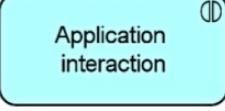
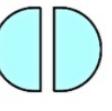
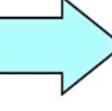
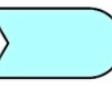
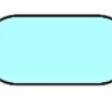
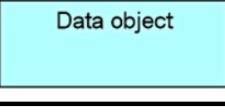
Element	Description	Notation
Business actor	Represents a business entity that is capable of performing behavior.	
Business role	Represents the responsibility for performing specific behavior, to which an actor can be assigned, or the part an actor plays in a particular action or event.	
Business collaboration	Represents an aggregate of two or more business internal active structure elements that work together to perform collective behavior.	
Business interface	Represents a point of access where a business service is made available to the environment.	
Business process	Represents a sequence of business behaviors that achieves a specific result such as a defined set of products or business services.	
Business function	Represents a collection of business behavior based on a chosen set of criteria (typically required business resources and/or competencies), closely aligned to an organization, but not necessarily explicitly governed by the organization.	
Business interaction	Represents a unit of collective business behavior performed by (a collaboration of) two or more business actors, business roles, or business collaborations.	

Business event	Represents an organizational state change.	
Business service	Represents explicitly defined behavior that a business role, business actor, or business collaboration exposes to its environment.	
Business object	Represents a concept used within a particular business domain.	
Contract	Represents a formal or informal specification of an agreement between a provider and a consumer that specifies the rights and obligations associated with a product and establishes functional and non-functional parameters for interaction.	
Representation	Represents a perceptible form of the information carried by a business object.	
Product	Represents a coherent collection of services and/or passive structure elements, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers.	

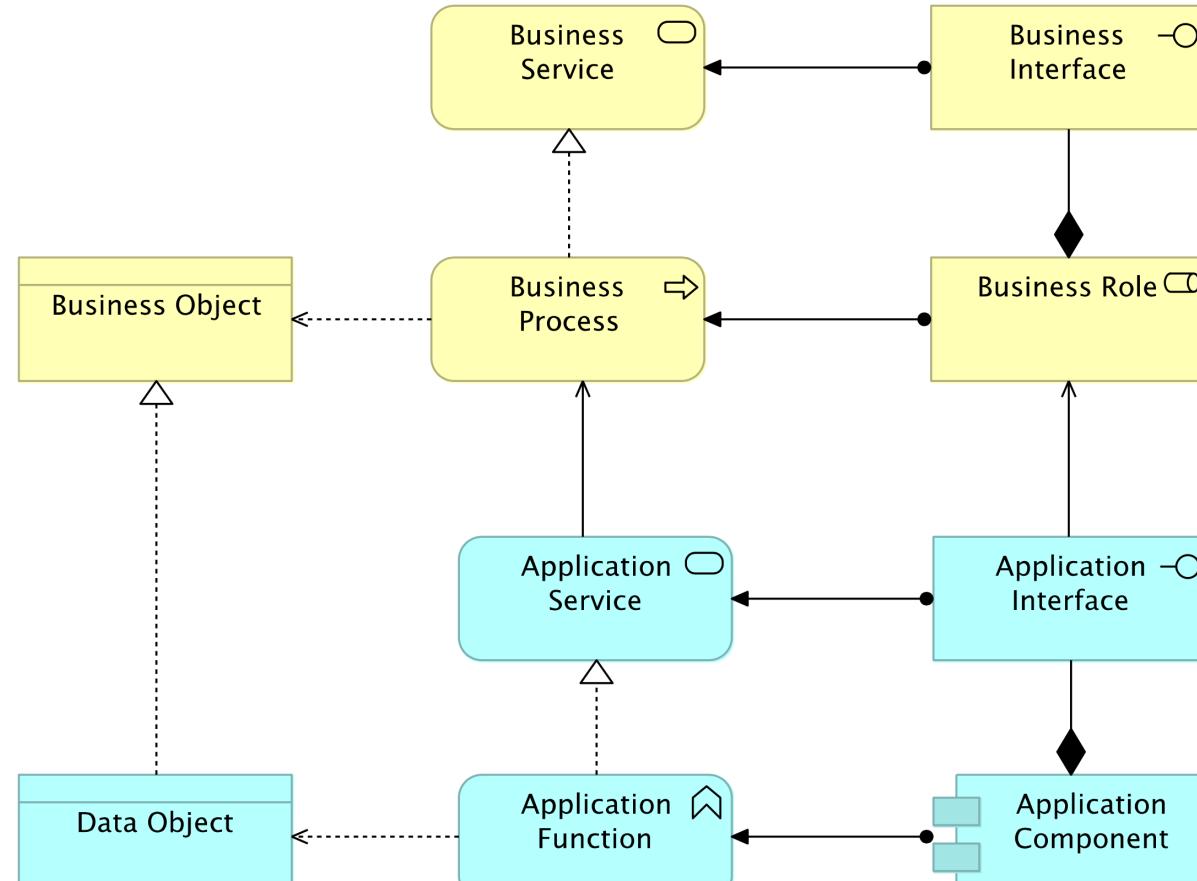
Pattern – Application



- ← This is the **Access** relation
- ♦ This is the **Composition** relation
- △----- This is the **Realization** relation
- ↔● This is the **Assignment** relation

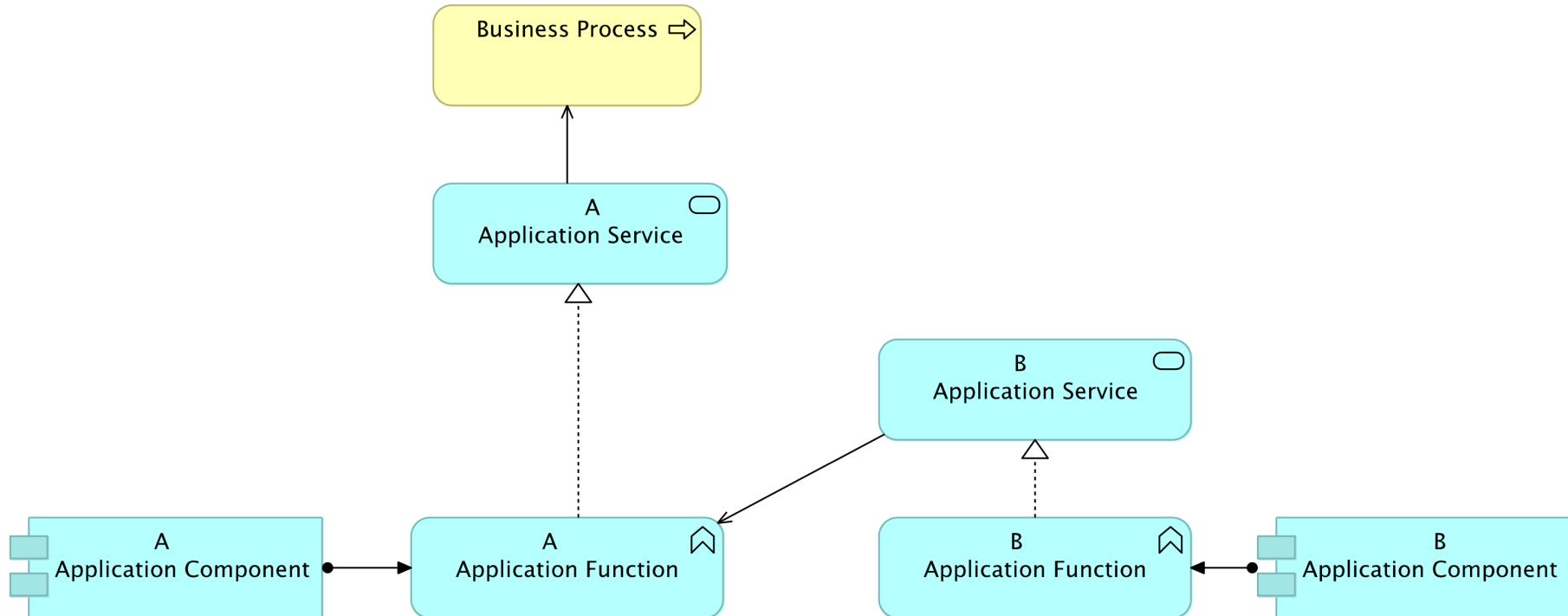
Element	Definition	Notation
Application component	Represents an encapsulation of application functionality aligned to implementation structure, which is modular and replaceable.	 
Application collaboration	Represents an aggregate of two or more application internal active structure elements that work together to perform collective application behavior.	 
Application interface	Represents a point of access where application services are made available to a user, another application component, or a node.	 
Application function	Represents automated behavior that can be performed by an application component.	 
Application interaction	Represents a unit of collective application behavior performed by (a collaboration of) two or more application components.	 
Application process	Represents a sequence of application behaviors that achieves a specific result.	 
Application event	Represents an application state change.	 
Application service	Represents an explicitly defined exposed application behavior.	 
Data object	Represents data structured for automated processing.	

Pattern – Business + Application



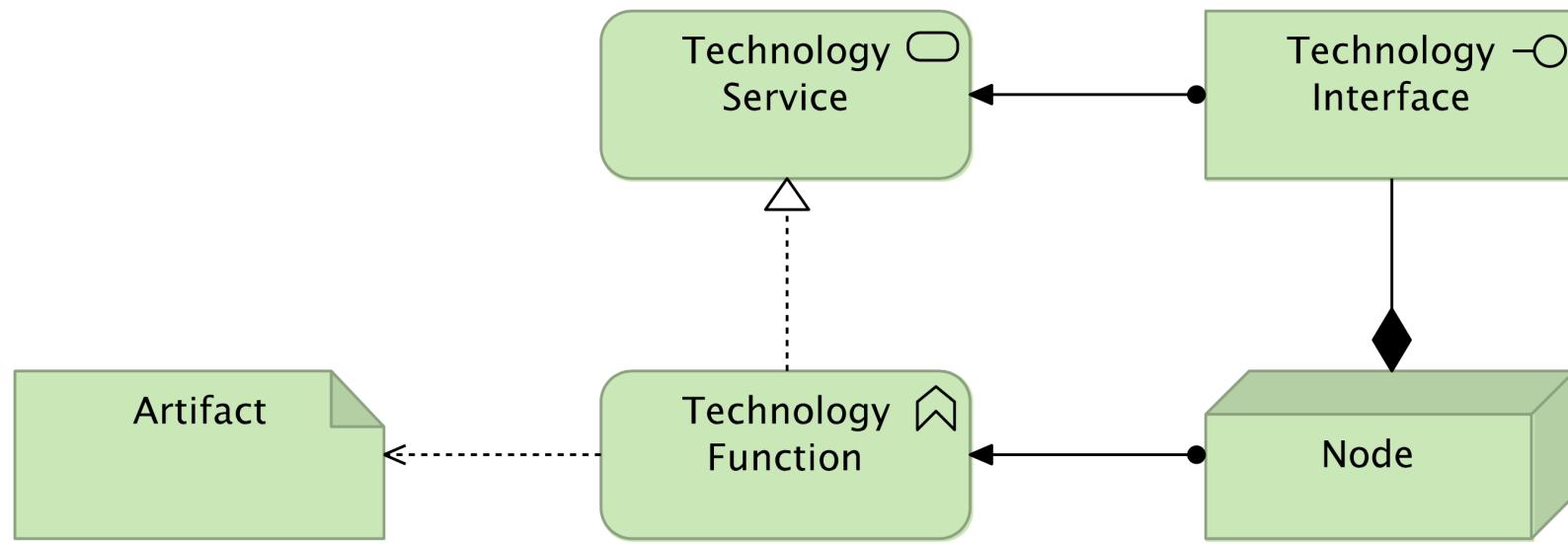
← This is the **Serving** relation

Pattern – Application (dipendenze)

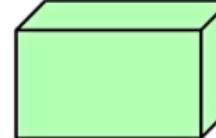
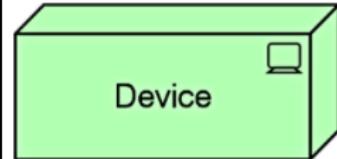
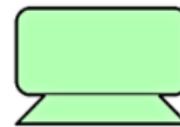
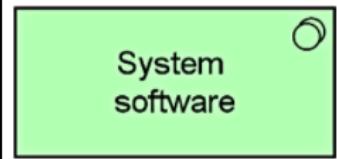
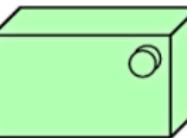
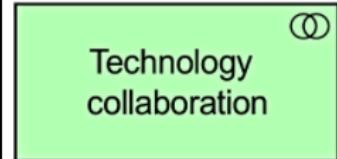
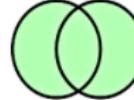
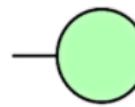


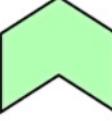
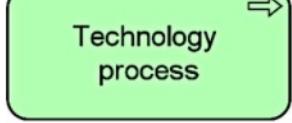
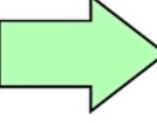
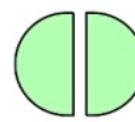
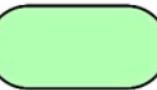
← This is the **Serving** relation

Pattern – Technology

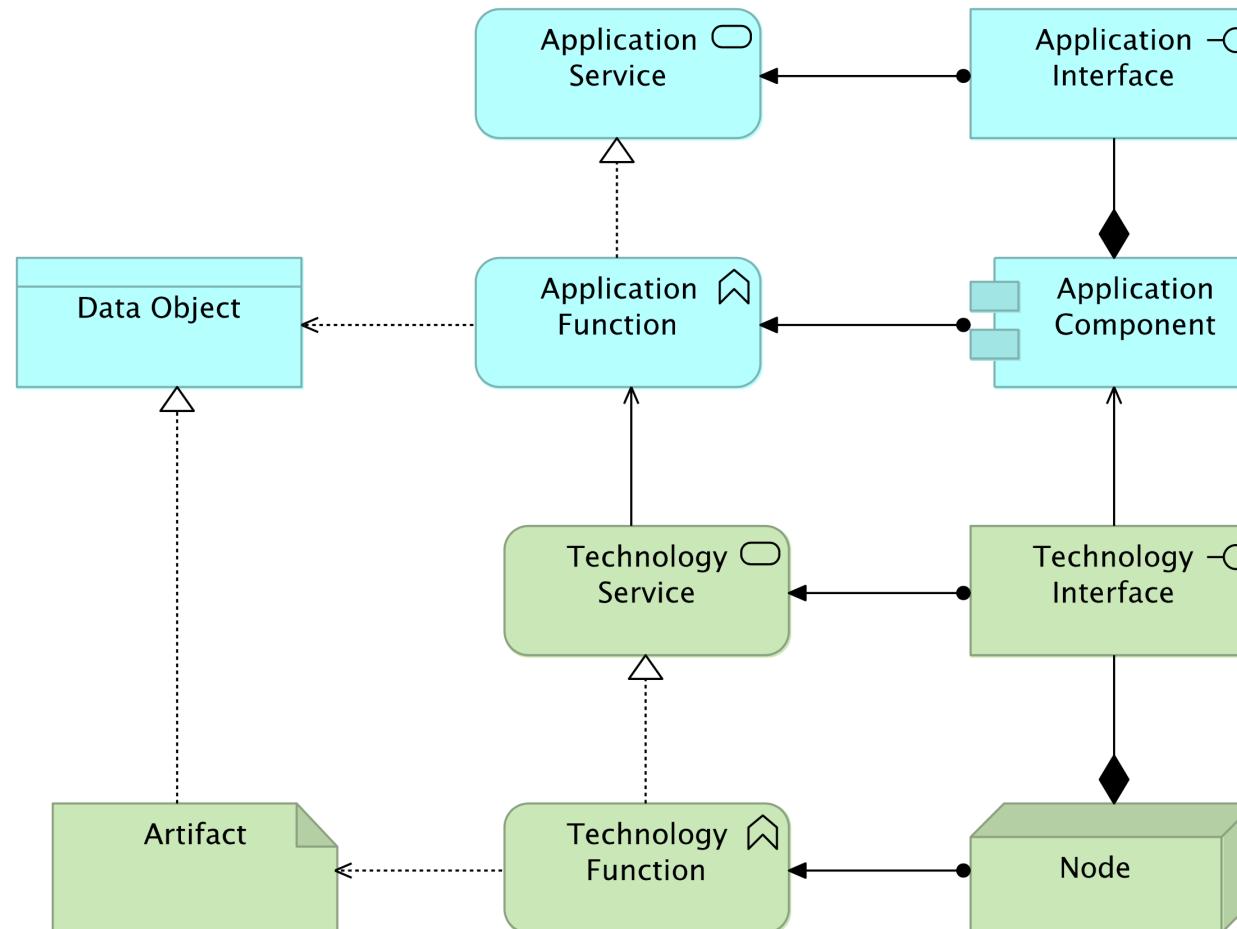


- ← This is the **Access** relation
- This is the **Composition** relation
- △----- This is the **Realization** relation
- ↔ This is the **Assignment** relation

Element	Definition	Notation
Node	Represents a computational or physical resource that hosts, manipulates, or interacts with other computational or physical resources.	 
Device	Represents a physical IT resource upon which system software and artifacts may be stored or deployed for execution.	 
System software	Represents software that provides or contributes to an environment for storing, executing, and using software or data deployed within it.	 
Technology collaboration	Represents an aggregate of two or more technology internal active structure elements that work together to perform collective technology behavior.	 
Technology interface	Represents a point of access where technology services offered by a node can be accessed.	 

Path	Represents a link between two or more nodes, through which these nodes can exchange data, energy, or material.	 
Communication network	Represents a set of structures that connects nodes for transmission, routing, and reception of data.	 
Technology function	Represents a collection of technology behavior that can be performed by a node.	 
Technology process	Represents a sequence of technology behaviors that achieves a specific result.	 
Technology interaction	Represents a unit of collective technology behavior performed by (a collaboration of) two or more nodes.	 
Technology event	Represents a technology state change.	 
Technology service	Represents an explicitly defined exposed technology behavior.	 
Artifact	Represents a piece of data that is used or produced in a software development process, or by deployment and operation of an IT system.	 

Pattern – Application + Technology



← This is the **Serving** relation

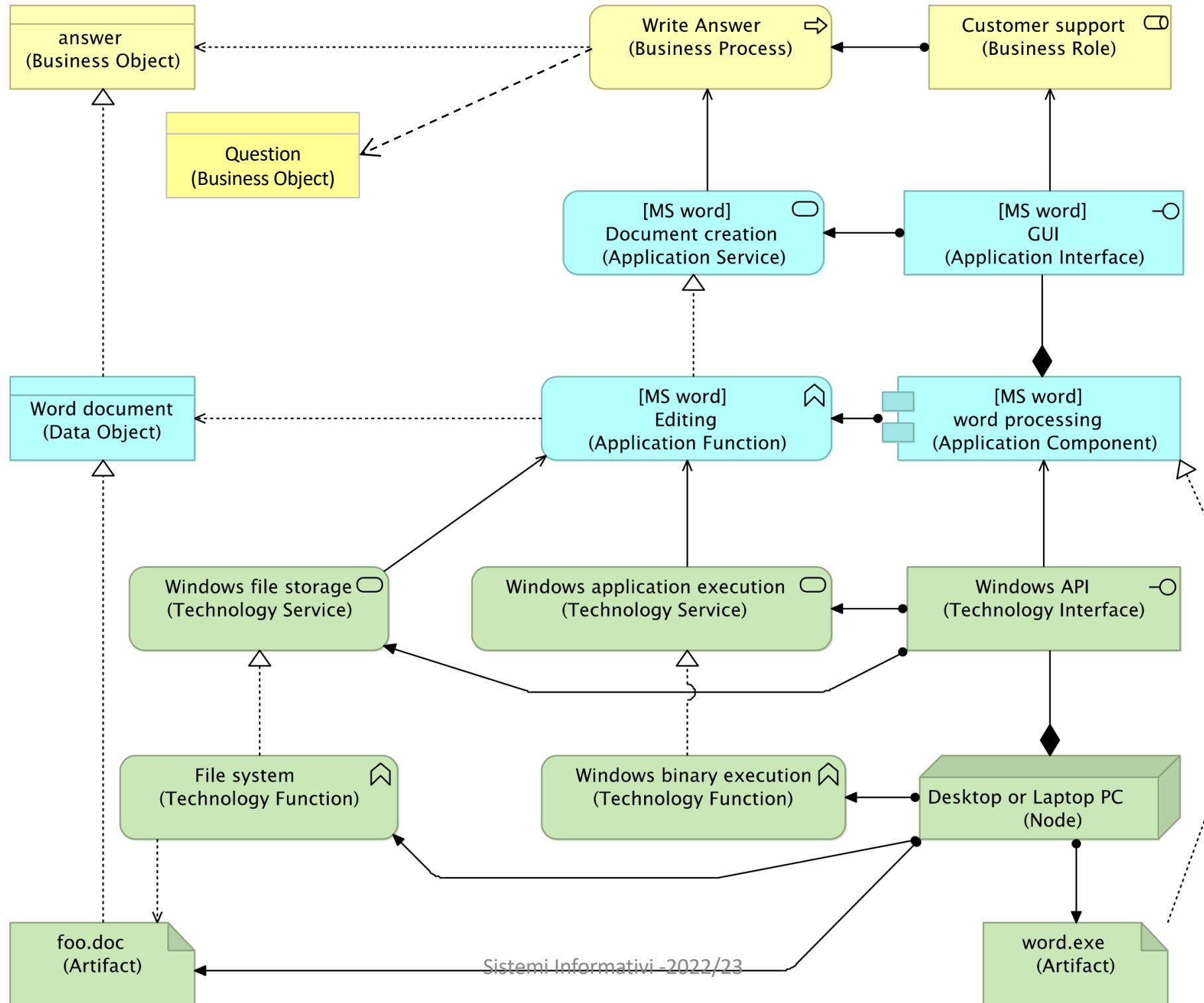
Serving = one element provides its functionality to another element

Esercizio

RISPOSTA AL CLIENTE

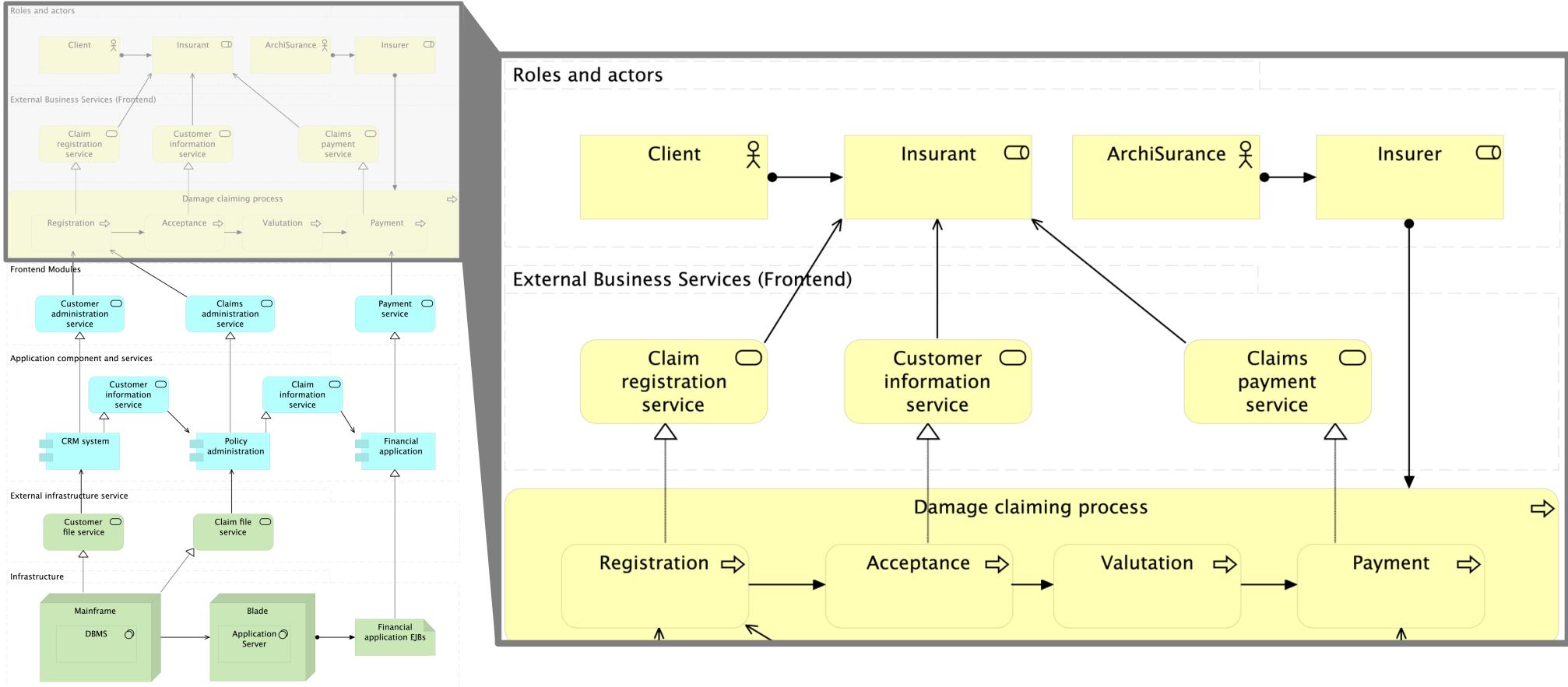
Esercizio – Risposta al cliente

Si descriva tramite un modello ArchiMate l’Enterprise Architecture necessaria al servizio clienti di una piccola azienda, in merito alla necessità di redigere risposte alle domande provenienti dai clienti.

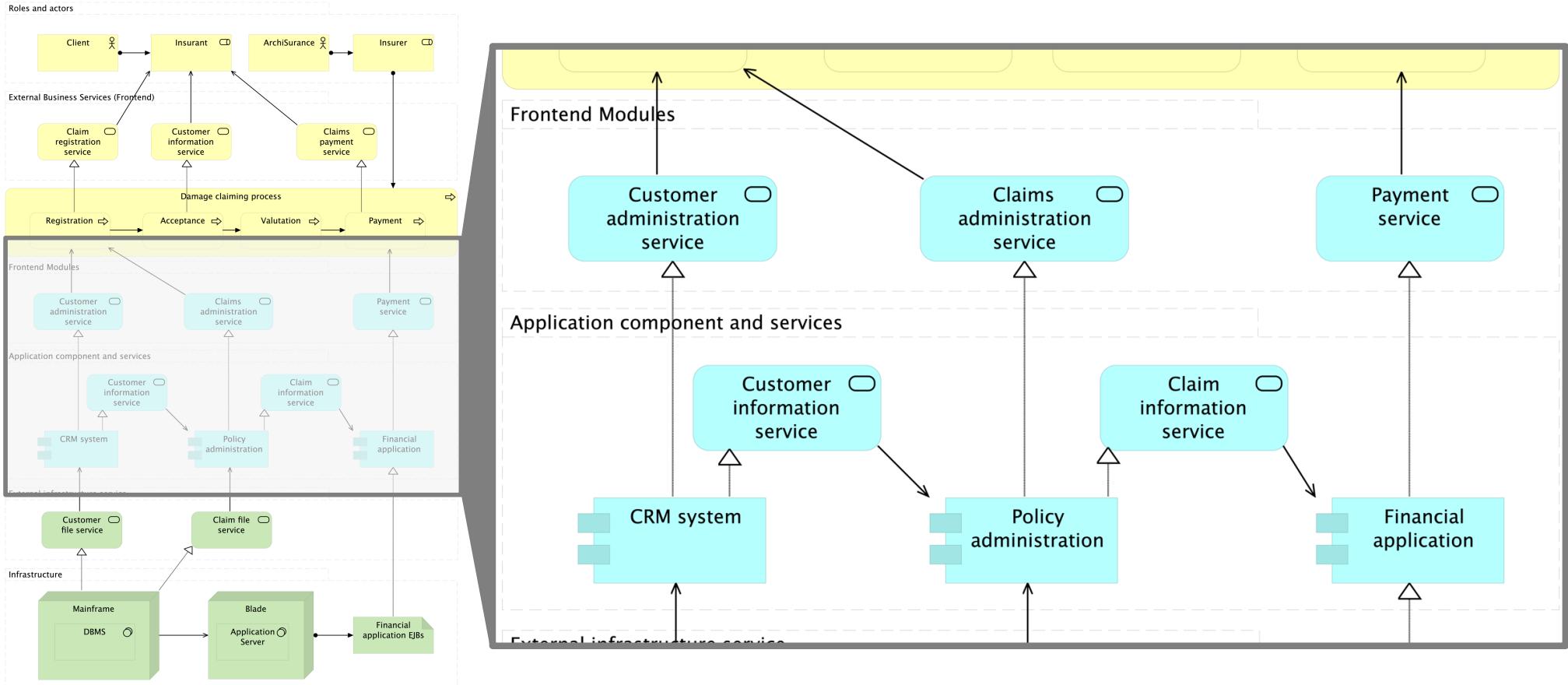


DA BOAT A ARCHIMATE

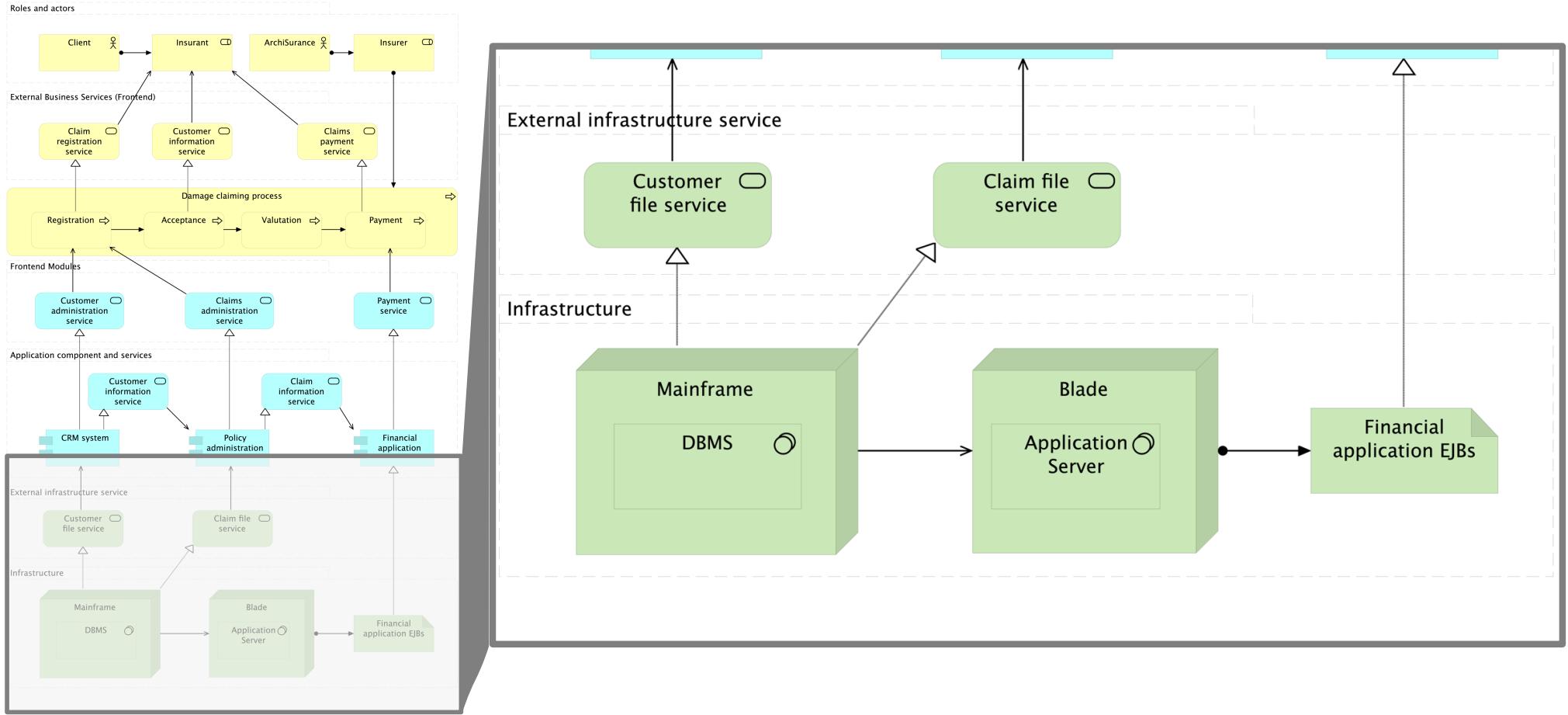
Esempio di EA



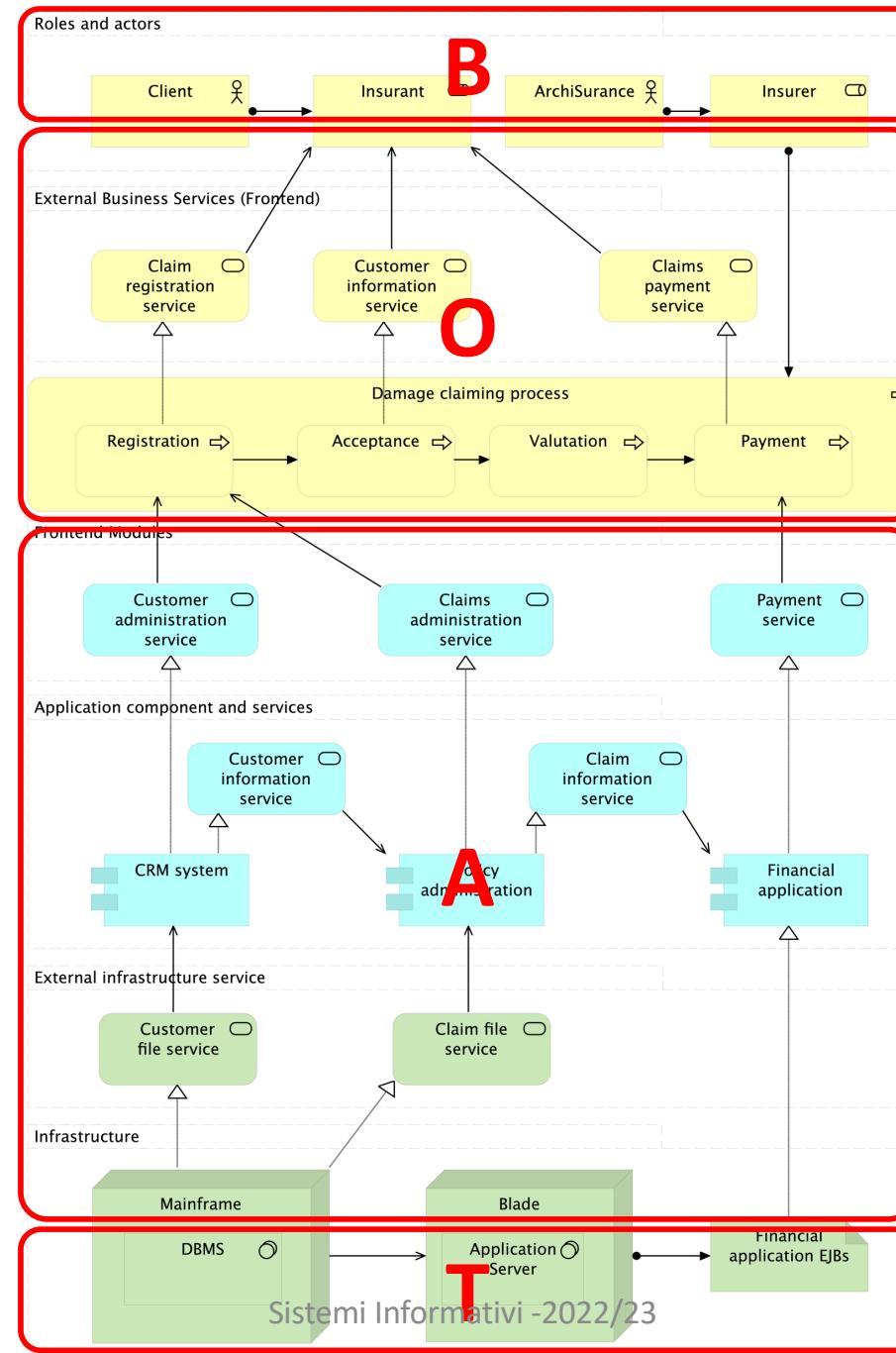
Esempio di EA



Esempio di EA

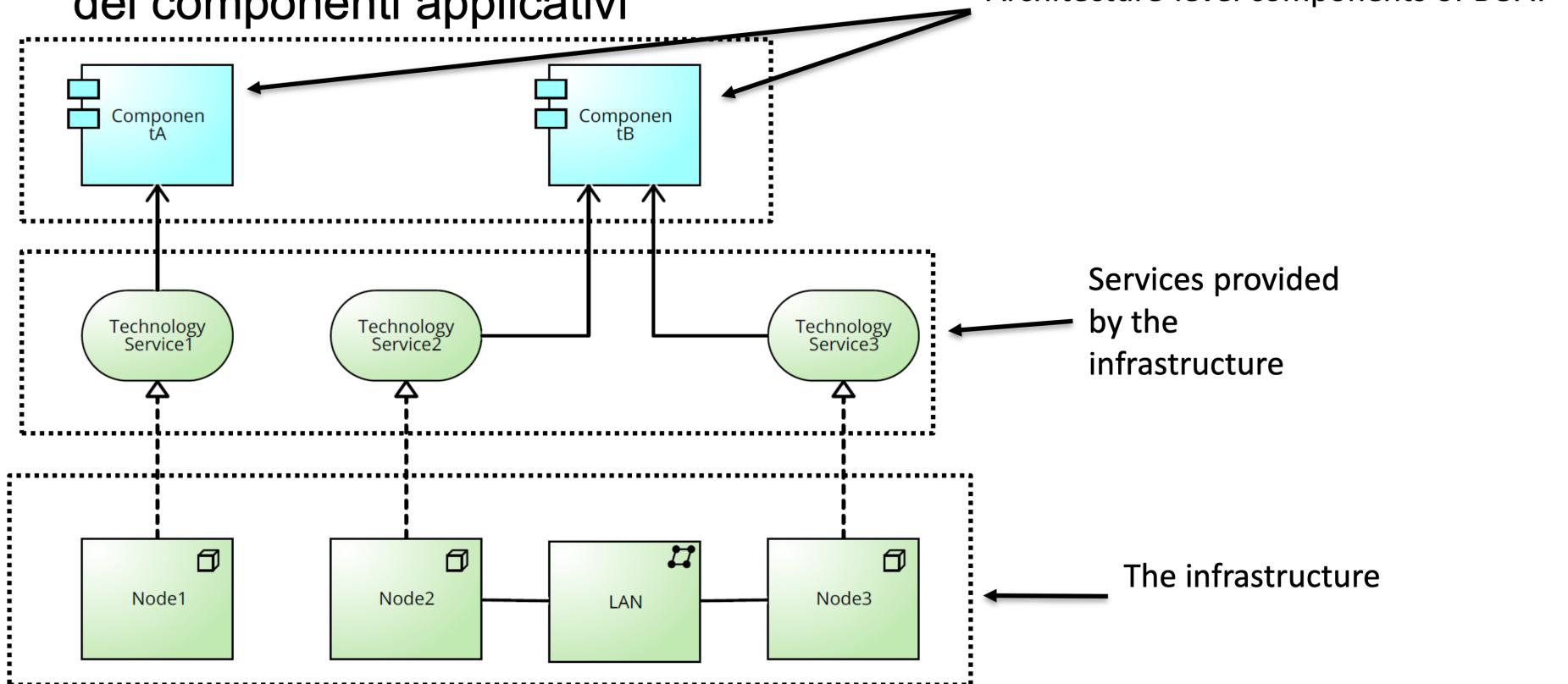


Esempio di EA

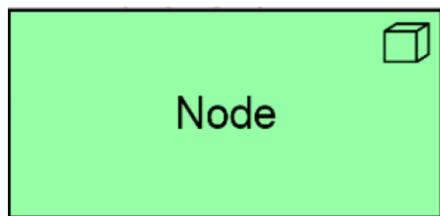


Modellazione Livello Tecnologico

Ci si focalizzerà sulla modellazione della tecnologia a supporto dei componenti applicativi



Livello Tecnologico

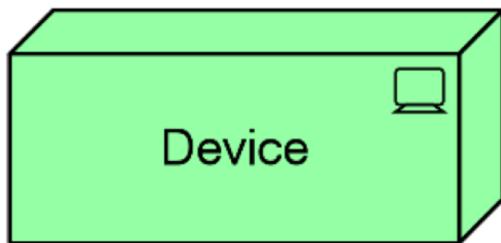


- Risorsa computazionale o fisica che ospita, manipola o interagisce con altre risorse fisiche o computazionali

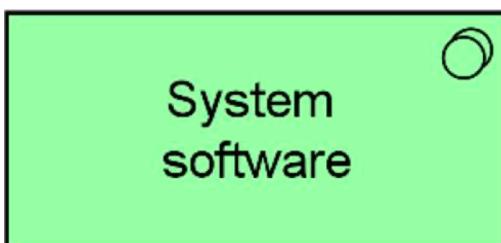


- Servizio offerto dalla tecnologia

Livello Tecnologico



- Risorsa IT fisica dove è possibile memorizzare ed eseguire software applicativo



- Software che permette la memorizzazione di dati e/o l'esecuzione di altro software applicativo

Livello Tecnologico



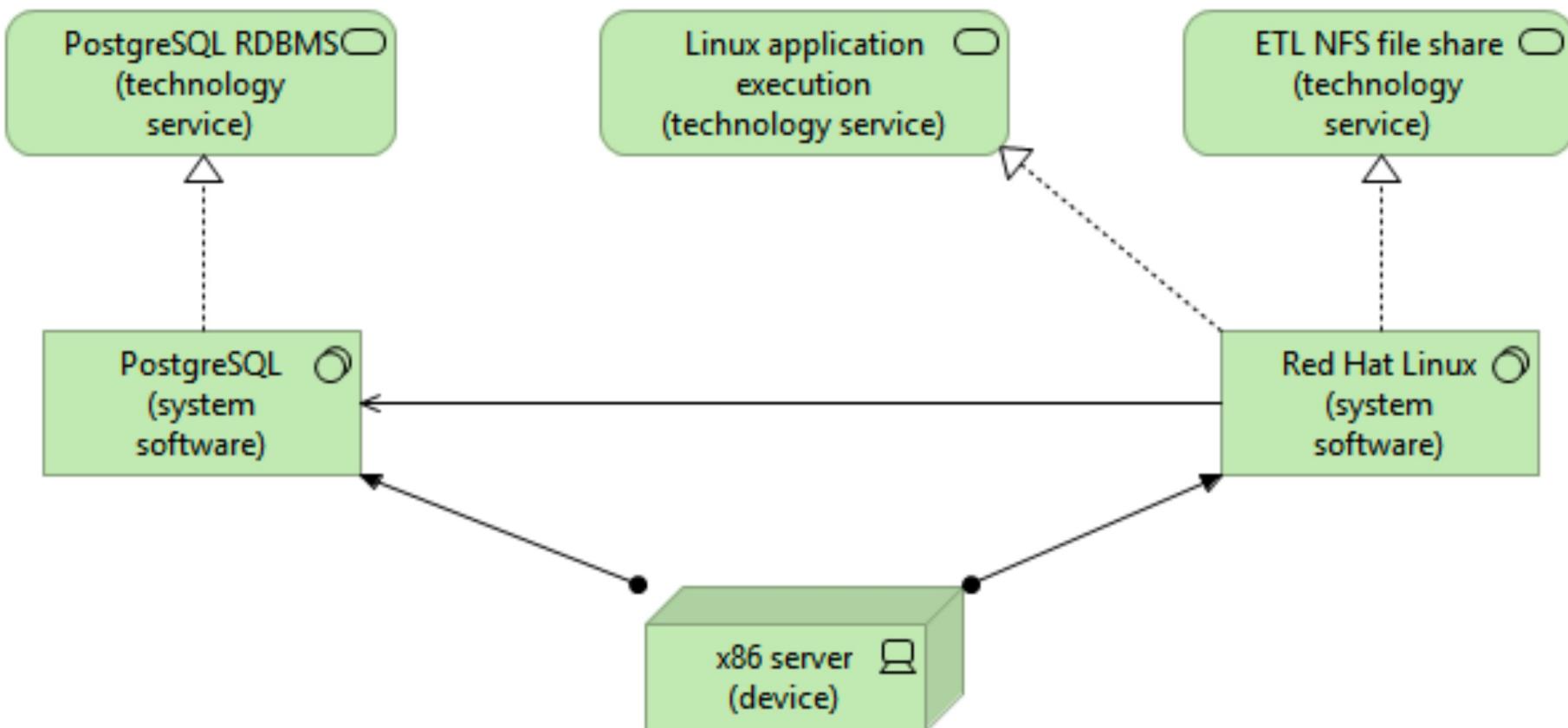
- Collegamento fisico o virtuale diretto (senza intermediari) tra due nodi, tramite il quale è possibile scambiare informazioni e accedere a risorse. Si usa per comunicazioni point-to-point.



- Insieme di apparati e protocolli che permette il collegamento tra computer o altri dispositivi elettronici, consentendo trasmissione, instradamento e ricezione di dati. Si usa per comunicazioni con topologia di rete complessa.
- **Association relation:** collega un nodo ad una rete o path

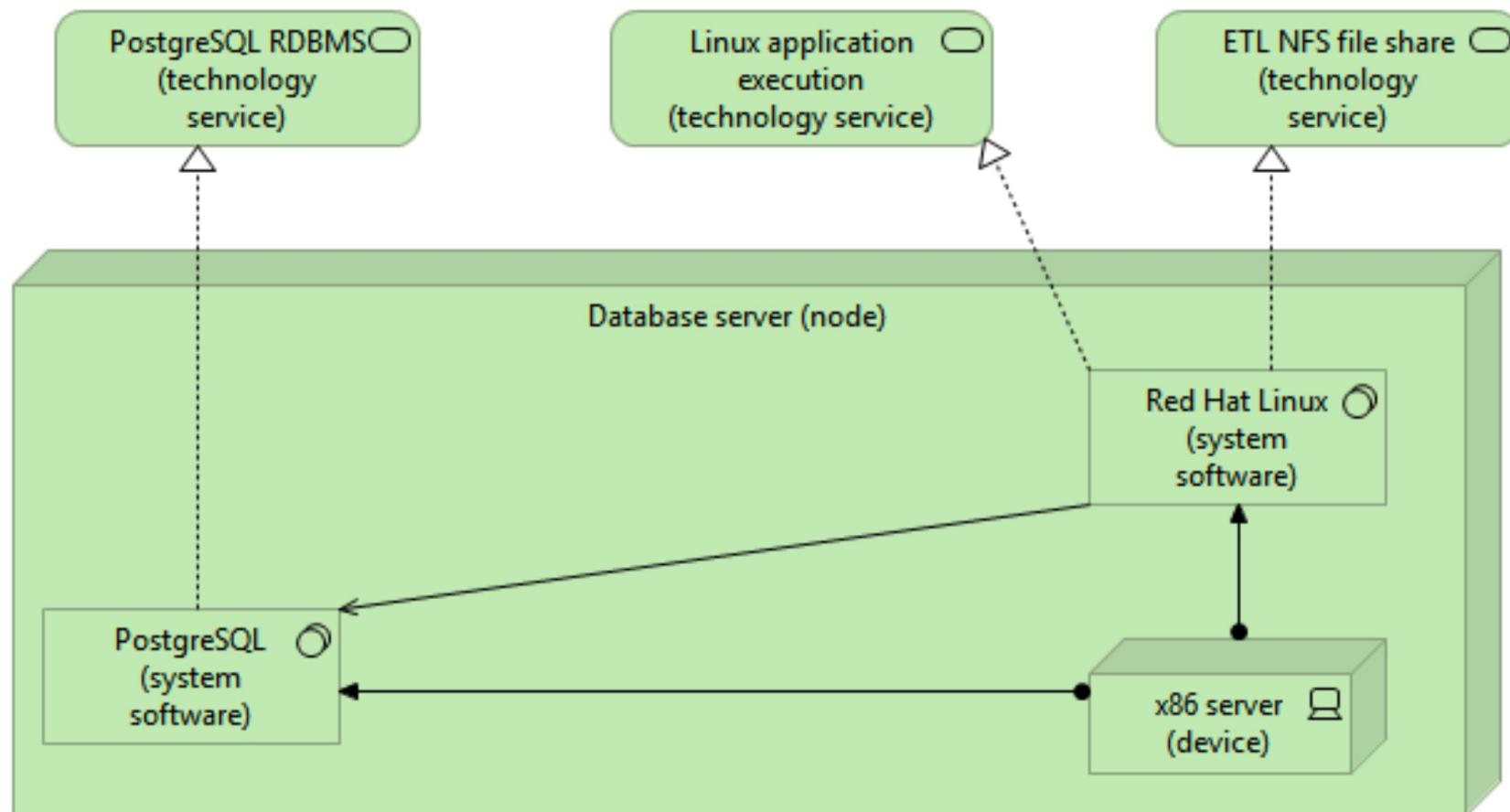
Livello Tecnologico

Esempio



Livello Tecnologico

Esempio – nesting



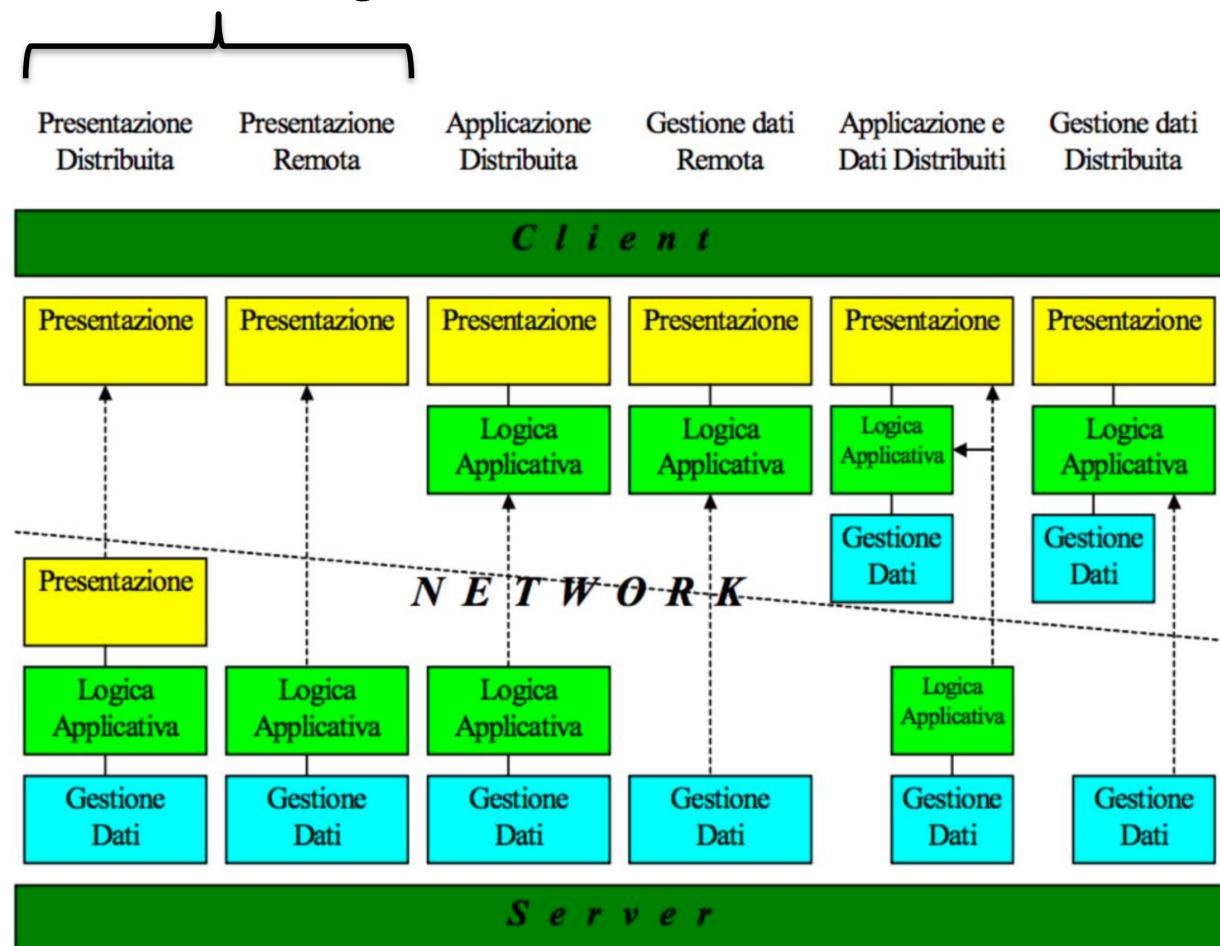
- Annido le entità che sono raggruppate da relazioni di Assegnamento, identificando un nodo da cui escono solo relazioni di Realizzazione

Esempi di

INFRASTRUTTURE NOTEVOLI

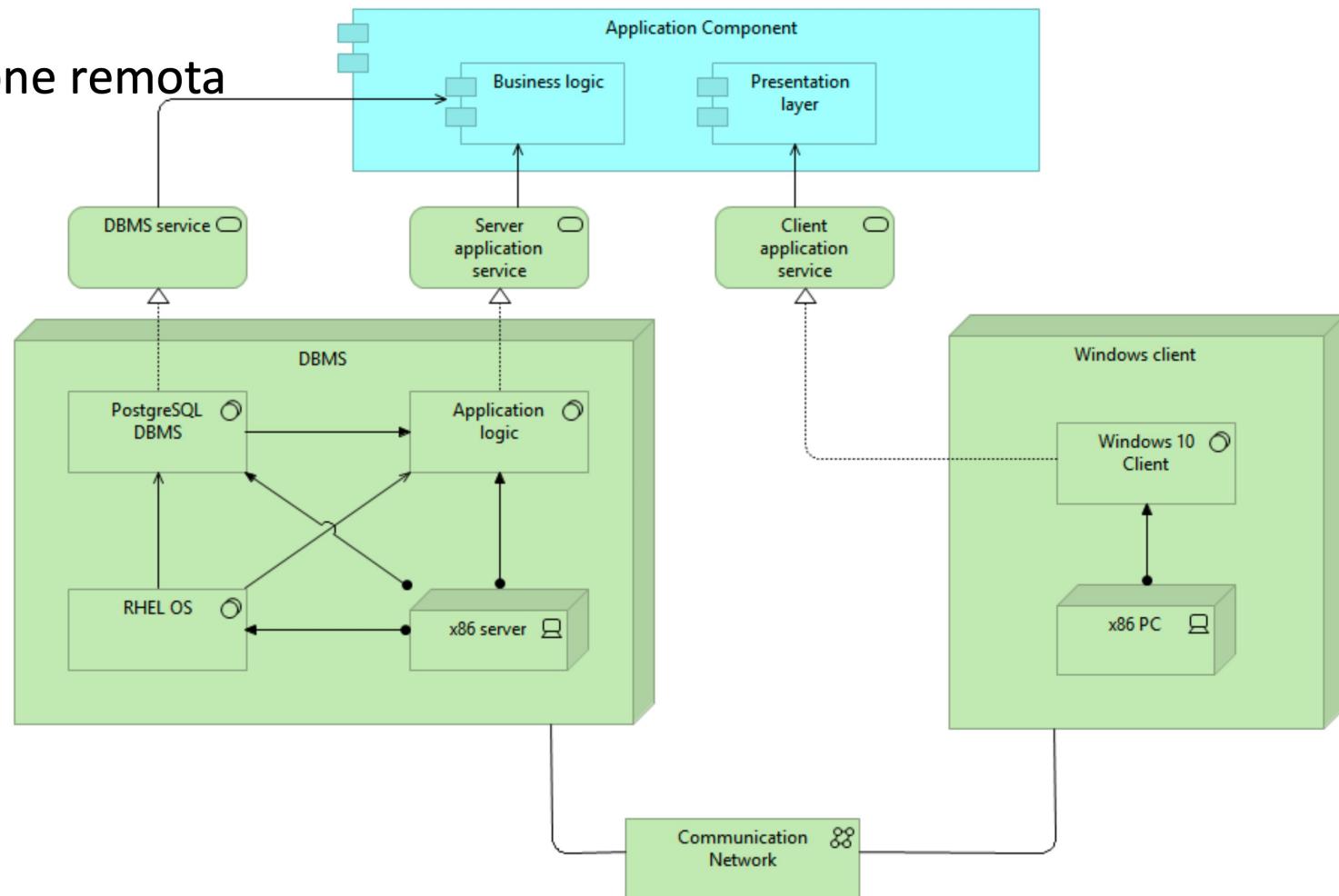
2-tier thin client

Thin client configuration



2-tier thin client

- Presentazione remota



3-tier: D, A, P (config. 7)

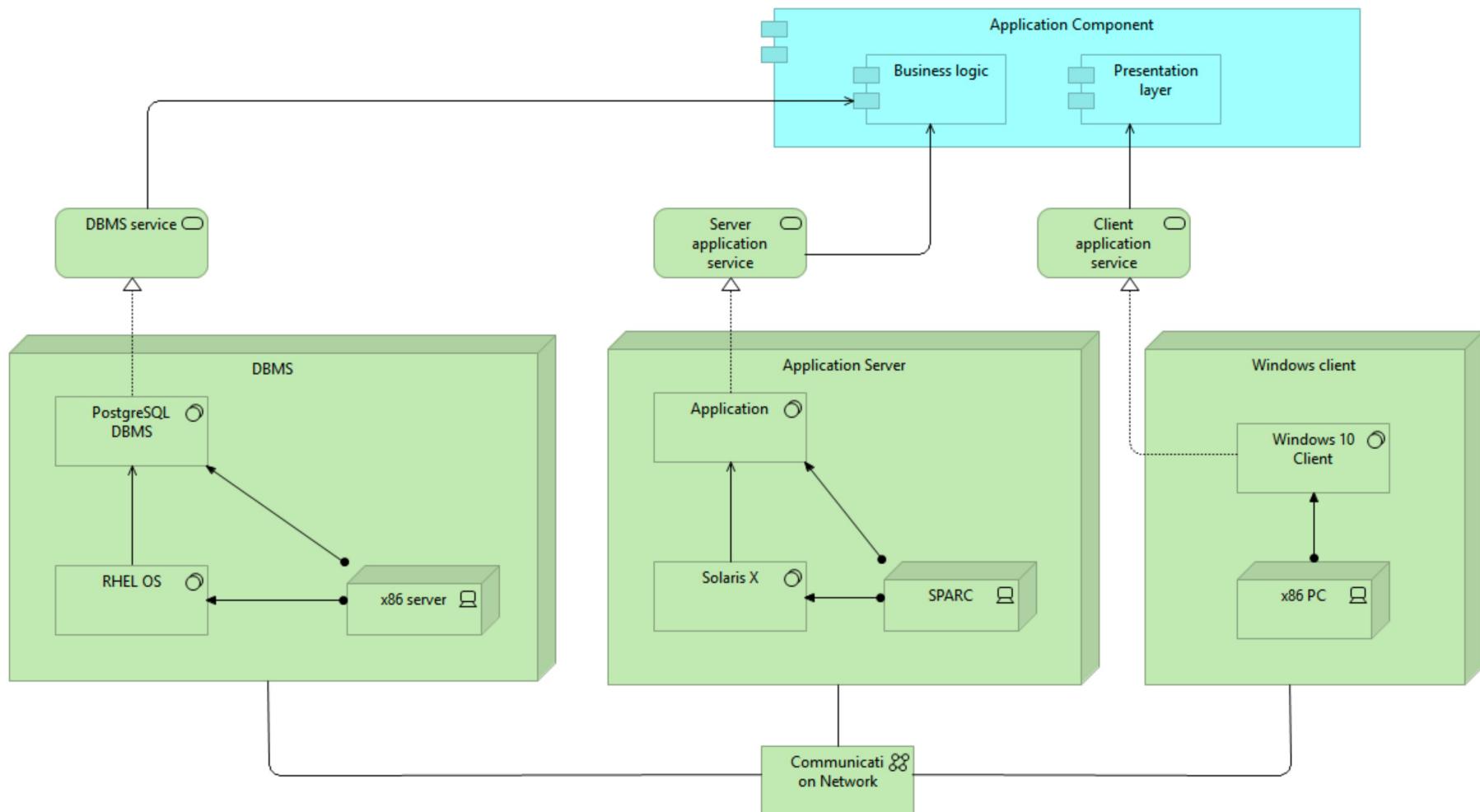
Layers:

- Data
- Application
- Presentation



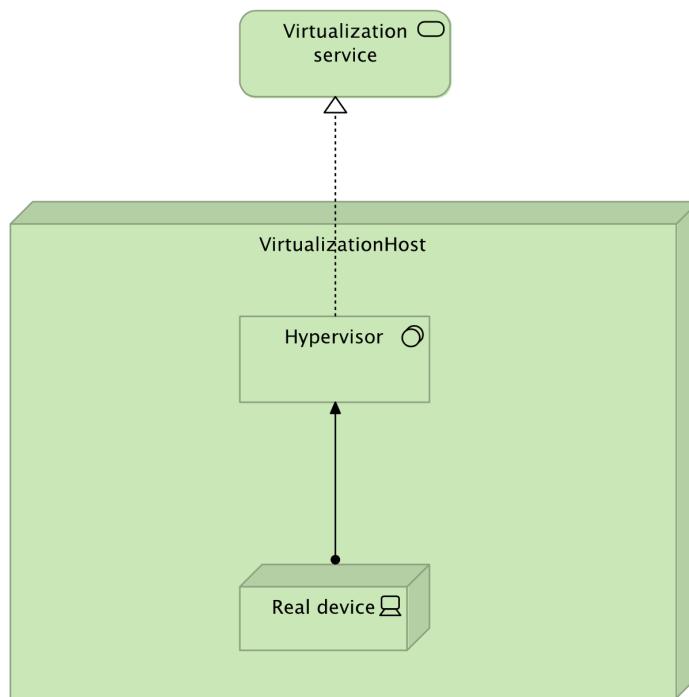
Config. /Tier	1	2	3	4	5	6	7	8	9	10	11	12	13
Tier 3	D	D	D	D	D,A	D	D	D,A	D	D	D,A	D,A	D,A, P
Tier 2	D	D	D,A	A	A	D,A	A	A	D,A, P	A,P	A,P	P	P
Tier 1	D,A, P	A,P	A,P	A,P	A,P	P	P	P	P	P	P	P	P

3-tier: D, A, P (config. 7)

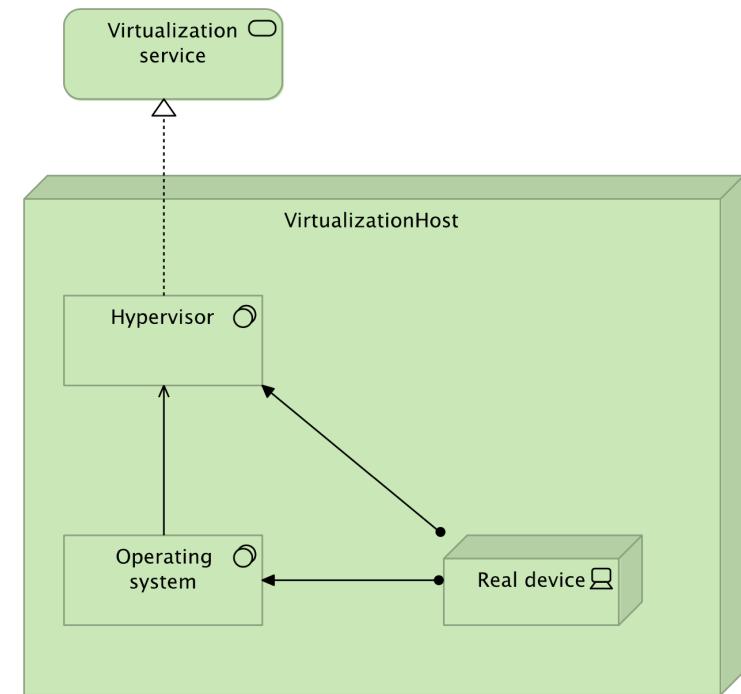


Virtualizzazione

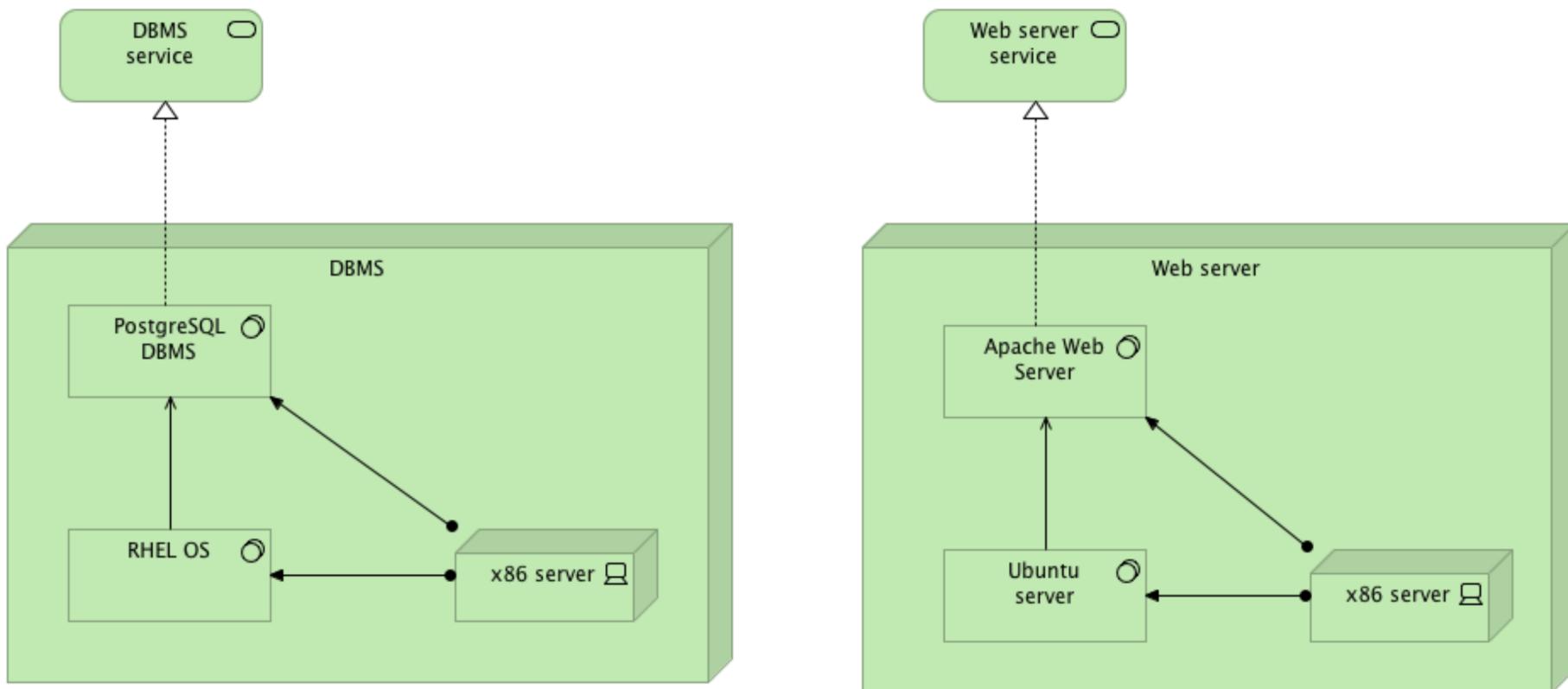
- Bare metal



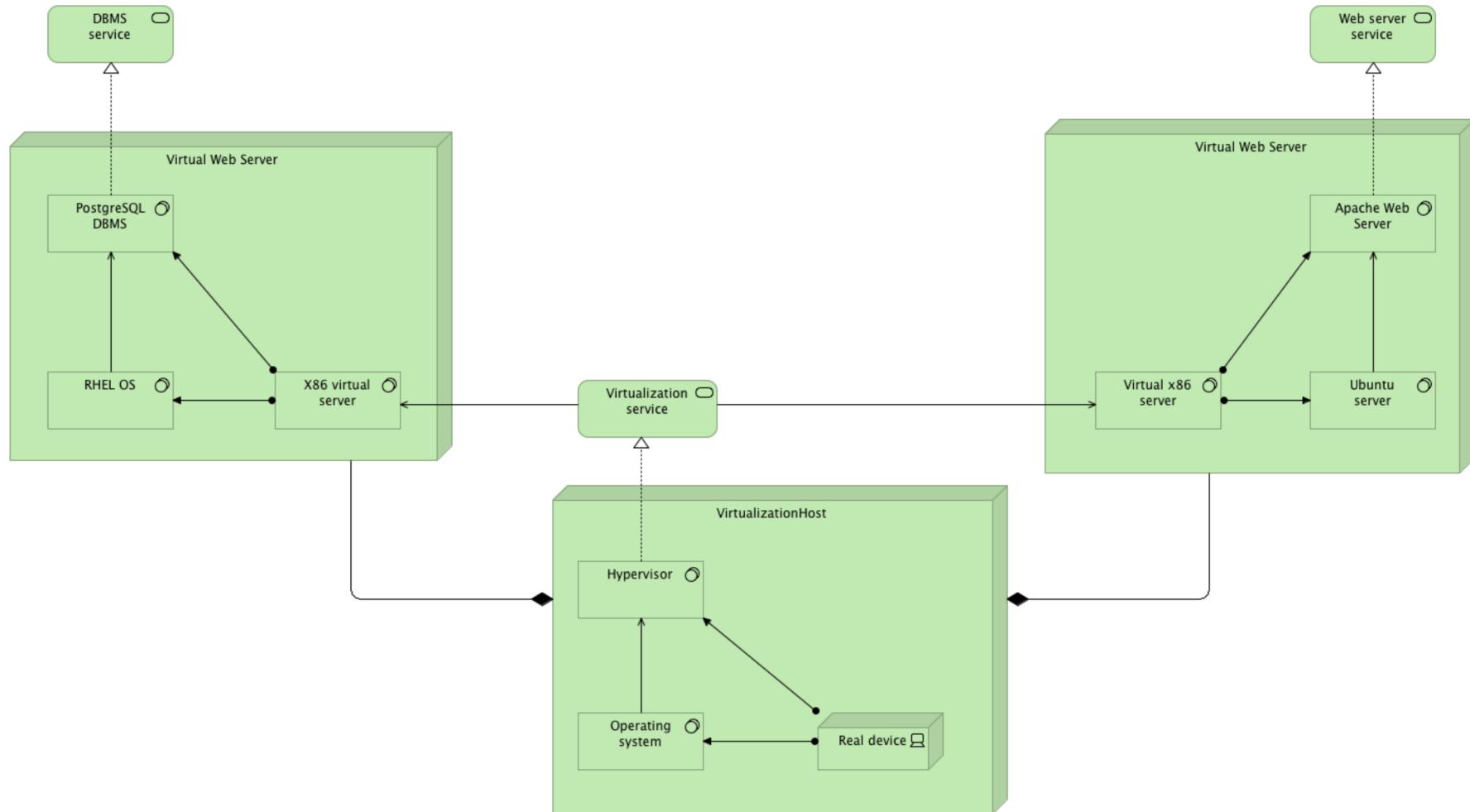
- Hosted



Server fisico



Server virtuale



References

- Official Archimate notation is available at:
 - <https://pubs.opengroup.org/>

Software di modellazione

- Software per Windows:
 - Stencil per Microsoft Visio (Gratis per studenti Politecnico):
 - <https://architecture-center.com/blog/archimate-3-0-stencil-set-for-visio.html>
- Software cross platform:
 - Archi (consigliato):
 - <https://www.archimatetool.com>
- Applicazioni web:
 - Signavio (Gratis per studenti Politecnico):
 - <http://academic.signavio.com/p/login>
 - Draw.io:
 - <https://www.draw.io>